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**DE-ALERTING THE U.S. AND RUSSIAN NUCLEAR ARSENALS: AN UNLIKELY METHOD OF ARMS CONTROL**

by

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December 1999

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# DE-ALERTING THE U.S. AND RUSSIAN NUCLEAR ARSENALS: AN UNLIKELY METHOD OF ARMS CONTROL

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Non-governmental organizations and observers have suggested that deteriorating conditions in Russia's nuclear weapons system could lead Russian decision-makers to order a nuclear missile launch on warning, thereby precipitating nuclear war between the United States and Russia. False or ambiguous early warning system alerts, combined with Russian fears of attack and readily available missiles, are held to create a dangerous mix of operating conditions. The proposed de-alerting measures would either disable the nuclear launch platforms or the missiles, thus extending the time required for launching an ICBM or SLBM. The thesis suggests that the proposed de-alerting methods are physically feasible but could have detrimental effects upon crisis stability and national security. Verifying de-alerting measures also presents additional problems. The assumptions employed by de-alerting proponents are inaccurate, and their scenarios are implausible. Other arms control methods are being pursued (such as U.S.-Russian cooperation in jointly operated early warning centers) that should be more effective at reducing the chances of an accidental nuclear exchange while preserving Russian and American national security.

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| | |
|---|---|
| ACP | Airborne Command Post |
| AFB | Air Force Base |
| BMEWS | Ballistic Missile Early Warning System |
| $C^2$ | Command and Control |
| CIA | Central Intelligence Agency |
| CTR | Cooperative Threat Reduction |
| DEFCON | Defense Condition |
| DOD | U.S. Department of Defense |
| EW | Early Warning |
| GLONASS | Global Navigation Satellite System |
| GPS | Global Positioning System |
| ICBM | Intercontinental Ballistic Missile |
| MOD | Russian Ministry of Defense |
| LOW | Launch on Warning |
| LUA | Launch Under Attach |
| MAWS | Missile Attack Warning System |
| NATO | North Atlantic Treaty Organization |
| NCA | National Command Authorities |
| NMCC | National Military Command Center |
| NORAD | North American Air Defense (Command) |
| PAL | Permissive Action Link |
| PRP | Personnel Reliability Program |
| SAC | Strategic Air Command |
| SALT | Strategic Arms Limitation Talks |
| SLBM | Sea Launched Ballistic Missile |
| SRF | Strategic Rocket Forces |
| START | Strategic Arms Reduction Talks |
| SSBN | Ballistic Missile Submarine (nuclear) |
| SSN | Attack Submarine (nuclear) |
| USAF | U.S. Air Force |
| USCINCPAC | U.S. Commander in Chief, Pacific |
| USN | U.S. Navy |
| USSTRATCOM | U.S. Strategic Command |

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# I. INTRODUCTION

This thesis analyzes a form of nuclear arms control called de-alerting. De-alerting consists of actions taken by the United States and Russia to remove intercontinental ballistic missiles (ICBMs) and sea-launched ballistic missiles (SLBMs) from their high state of day-to-day launch readiness. Decision-makers would thus be unable to order an immediate launch of their nuclear missiles. The claimed benefit of de-alerting would be a reduction in the chance of a nuclear exchange between Russia and the United States. The thesis examines the feasibility of the de-alerting proposals, the validity of the stated reasons for de-alerting, and the potential problems de-alerting might introduce. The thesis also explores alternative ways of reducing the chances of an unwanted nuclear exchange.

De-alerting proponents suggest that keeping Russian and American nuclear weapons on a high state of alert increases the probability of nuclear war by making a launch more likely in response to unexpected events.[1] This view is similar to "normal accident" theory, which suggests that whatever the extent of efforts for maintaining high levels of reliability and safety, accidents are bound to happen.[2] This is an unfortunate characteristic of complex systems with tight coupling. The American and Russian systems have tight coupling within and between their respective systems. Because of tight coupling, stimuli at the sensor

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[1] Bruce G. Blair, Harold A. Feiveson, and Frank N. von Hippel, "Taking Nuclear Weapons Off Hair-Trigger Alert," *Scientific American*, November 1997, 76.
[2] Scott D. Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Accidents* (Princeton NJ: Princeton UP, 1993), 28.

portion of a system are quickly transmitted to the weapon end of the system. Tight coupling between the two systems in terms of intelligence, communications, and information processing also guarantees that action taken by one country would be quickly detected by the other country, leading to a prompt reaction on the part of the other country. This reaction would then be detected by the first country, possibly resulting in a cyclic chain of quick actions and decisions.

In the case of nuclear missiles, de-alerting proponents assume that because Russian and American missiles are *ready* to launch on short notice, decision-makers would be influenced in a way that would make it more likely that missiles *would* be launched—even on a false or ambiguous missile attack warning. De-alerting proponents claim that the combination of declining Russian early warning (EW) and command and control ($C^2$) system reliability, coupled with a high nuclear missile alert state, creates a dangerous situation that could easily lead to nuclear war. In theory, the delay in launch readiness would prevent precipitous use of nuclear missiles and force decision-makers to embark on something other than a "launch-on-warning" (LOW) response to a missile attack warning.

The scenario most often portrayed by de-alerting proponents includes three phases. First, Russian early warning personnel receive unexpected or ambiguous indications of a missile attack and pass this warning to Russian national political decision-makers. Second, Russian decision-makers have been

conditioned to expect an attack from the United States and further believe that their retaliatory capability (missile silos and command centers) cannot survive an attack. Thus they have strong incentives to "use or lose" their missiles and launch on warning. The scenario concludes by suggesting that the United States would automatically respond with a retaliatory strike, sending nuclear missiles on their way immediately after detecting the Russian missiles, instead of waiting for the Russian missiles to hit their targets.

## A. THESIS

This thesis explores the feasibility of de-alerting methods and their potential effect on crisis stability. It examines whether de-alerting proposals would reduce the likelihood of accidental or inadvertent nuclear war. It also suggests some alternatives to the de-alerting proposals.

This thesis answers several questions:

- Are the proposed de-alerting methods physically feasible? Would the proposed de-alerting measures accomplish their declared purposes?
- Is it correct to characterize current alert postures as "hair-trigger"? Do Russian and American doctrines adhere to a LOW philosophy?
- Could de-alerting verification be accomplished without adversely affecting launch platform survivability?
- If the United States de-alerted its nuclear forces, would Russia follow suit?

- Are there other ways of reducing the chances of an accidental or unintended launch besides de-alerting?
- What might be the possible effects upon crisis stability in a re-alerting situation?

The thesis concludes that keeping American and Russian nuclear forces on high states of alert does *not* amount to a "hair-trigger" posture and that the proposed de-alerting methods suffer both from feasibility as well as verification problems. There is a difference between a force that is ready to launch on a moment's notice and a willingness to launch based upon a preponderance of the information presented to national command authority (NCA) decision-makers. Additionally, the de-alerting measures could have adverse effects on the nuclear balance and crisis stability.

Figure 1 illustrates a possible sequence of actions within the U.S. and Russian nuclear weapons systems. The top row represents action taken within the early warning centers by military personnel. The duty officers must evaluate missile attack warning signals from satellites and long-range radar systems as actual or false. These same officers must in the case of an attack signal from an early warning sensor then validate the information and report to the national command leaders the likelihood of an attack in progress. In some cases the national command leaders, those who must advise the President on an appropriate response, get the early warning signal at the same time as the duty officers in the early warning evaluation centers. The middle row represents the

nation's command and decision personnel who must act on a combination of the early warning center duty officer's validation report, a knowledge of their weapon system's capabilities, and knowledge of the global political situation.

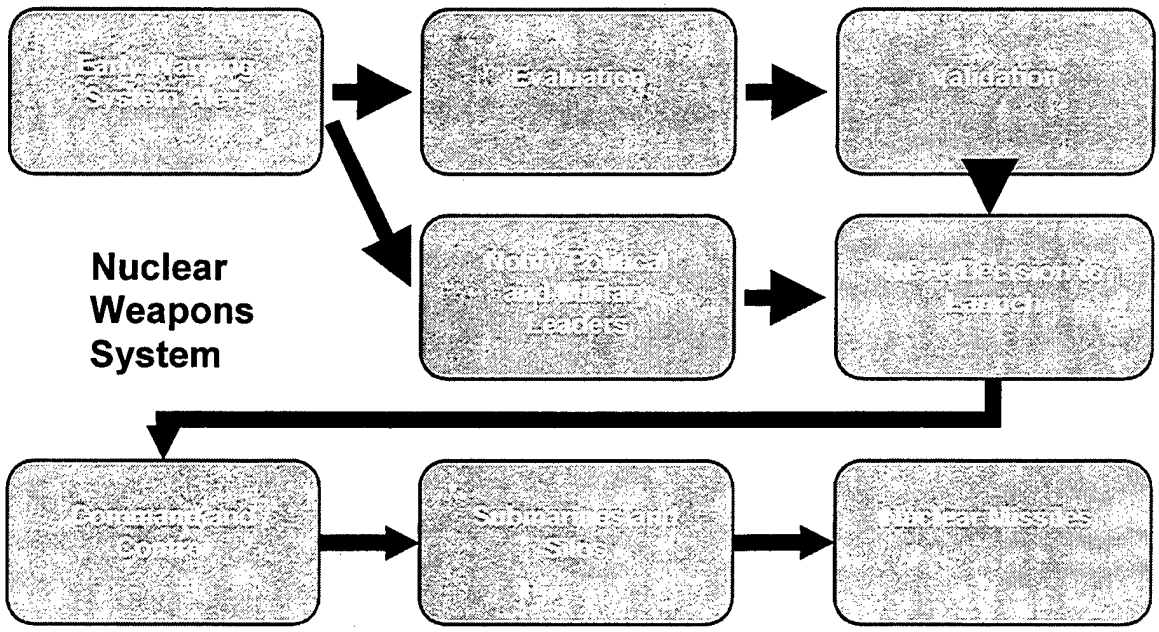


**Figure 1: Basic Nuclear Weapons System**

These decision-makers represent the Russian equivalent of the U.S. National Command Authorities, or NCA. The Russian NCA would presumably act according to its response doctrine. However, de-alerting proponents argue that the Russian NCA would further be influenced by pre-conceived notions about U.S. attack intentions as well as fears of Russian command and missile system vulnerability to a U.S. first strike. In the bottom row, an NCA decision to launch nuclear missiles would be communicated via Russian General Staff command channels to military commanders in submarines and missile silos. At this level missile launch teams would launch their nuclear-armed missiles as long as

specific checks yielded a positive confirmation of launch orders and usable weapons unlocking codes.

To modify the claimed "hair-trigger" alert posture of current Russian and U.S. nuclear missile systems, de-alerting proponents would remove the ability to launch missiles on short notice. The solutions proposed by the de-alerting proponents focus on the final two blocks of Figure 1—launch platforms (submarines and silos) and missiles. The specific de-alerting methods are technical measures to make nuclear missiles harder to launch on short notice, by removing or disabling critical launch system and missile components. In some cases, they call for separating warheads from the missiles or directing submarines to patrol out of range of their potential targets. Each of the proposed methods introduces time delays in putting missiles back together, enabling launch mechanisms in silos, or moving launch systems to within range of targets.

In addition to evaluating the de-alerting proposals, this thesis also examines those areas of the nuclear weapons system that the de-alerting proponents do not—in particular the early warning systems and political-cultural factors affecting the national decision-makers. There could be action taken in these areas in lieu of or in concert with the proposed de-alerting methods that could result in much lower chances of a Russian nuclear missile launch on a false or ambiguous missile attack warning.

## B. IMPORTANCE AND RELEVANCE

Determining if de-alerting is warranted is relevant to nuclear weapons systems readiness. It must be included in any assessment of the desirability of reductions or eventual elimination of nuclear missiles. Believing the claim that "hair-trigger" alerts exist could result in American and Russian leaders taking premature steps to de-alert their nuclear forces before other systems are in place to ensure crisis stability. Other countries might be more likely to use their limited nuclear capabilities against the de-alerted American and Russian forces, perceiving an advantage to striking first in a crisis.

## C. METHODOLOGY AND SOURCES

This thesis is based on published accounts of previous problems in the U.S. and Russian early warning and command and control systems and recent reports of system malfunctions.[3] While publications by advocates of de-alerting are relatively abundant, little official government material appears in open sources that evaluates de-alerting feasibility or states any conclusive U.S. or Russian government positions. However, several prominent figures that work or have worked in the nuclear weapons field have written about some of the potential problems with the de-alerting proposals. General Eugene Habiger, USAF, former commander of the U.S. Strategic Command, and Dr. Kathleen Bailey, formerly a senior fellow at the Lawrence Livermore National Laboratory, object to the de-alerting scheme and have testified so before the U.S. Congress.

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[3] For example: Sagan, *The Limits of Safety*; Peter Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons*, (New York: Cornell UP, 1992).

This thesis begins by analyzing de-alerting proposals to identify the problems de-alerting might introduce in the U.S. and Russian nuclear weapons systems, and the challenges of verification. The technical means of de-alerting may cause problems of a technical as well as non-technical nature. De-alerting proponents say little about political and doctrinal problems that could accompany de-alerting schemes. They similarly do not address problems with verifying that each country remained de-alerted.

Verification has long been considered a necessary aspect of arms control. Relying on the de-alerted party to remain in that condition would require either "faith and good will" or some kind of physical verification, either personally or with installed devices. This could be done with physical inspection teams or with installed devices providing remotely monitored signals. Richard Garwin, a Senior Fellow for Science and Technology on the Council on Foreign Relations, has proposed several ideas for electronic verification systems, but does not address closer physical verification, such as on-site inspections.[4] Could one nonetheless fashion an effective verification regime? Kenneth Adelman points out that verification is useless without the means of enforcing the original agreement or punishing violations.[5]

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[4] Richard L. Garwin, "De-Alerting of Nuclear Retaliatory Forces," *De-Alerting of Nuclear Retaliatory Forces* (Paris, France, Amaldi Conference, 20-22 November 1997), Available Online: http://www.fas.org/rlg/de-alerting.htm

[5] Kenneth L. Adelman, "Why Verification is More Difficult (and Less Important)," *International Security* 14.4 (Spring 1990), 141.

The thesis next considers the de-alerting proponents' arguments about Russian NCA behavior. It tests the de-alerting proponents' claim that, with a high missile alert posture, Russian NCA mistrust combined with frequent early warning system false-alerts would result in a high likelihood of a decision to launch. Do Russian NCA decision-makers have an inherent fear of attack from the United States? In 1977 Jack Snyder defined the essence of the Soviet strategic culture at that time that shaped Cold War attitudes about nuclear doctrine and behavior.[6] The question to be considered is whether post-Cold War Russian beliefs about American intentions would translate into a greater tendency to order a nuclear response to a missile attack warning. Would the Russian NCA order a launch on warning (LOW) retaliation? This portion of the study examines Russian strategic culture and current confidence-building measures such as shared early warning systems and military-to-military exchanges that may influence Russian beliefs about U.S. intentions.

This thesis also explores the concept of "hair-trigger" alert, including whether it really exists, and the effect if any on the probability of accidental nuclear war. It examines Russian and U.S. early warning system performance, and whether the number and nature of the false or ambiguous alarms have caused "hair-trigger" responses. While obviously no alarm has led to actual

[6] Jack L. Snyder, "The Soviet Strategic Culture: Implications for Limited Nuclear Operations," *Project AIR FORCE Report R-2154-AF* (Santa Monica, CA, RAND, September 1977), 8.

nuclear weapons use, it would be useful to see how far decision-makers actually progressed toward ordering a nuclear launch.

Figure 2 summarizes the combinations of Russian EW system false alarm rates and level of NCA mistrust under consideration and the effect of a high alert status upon LOW.

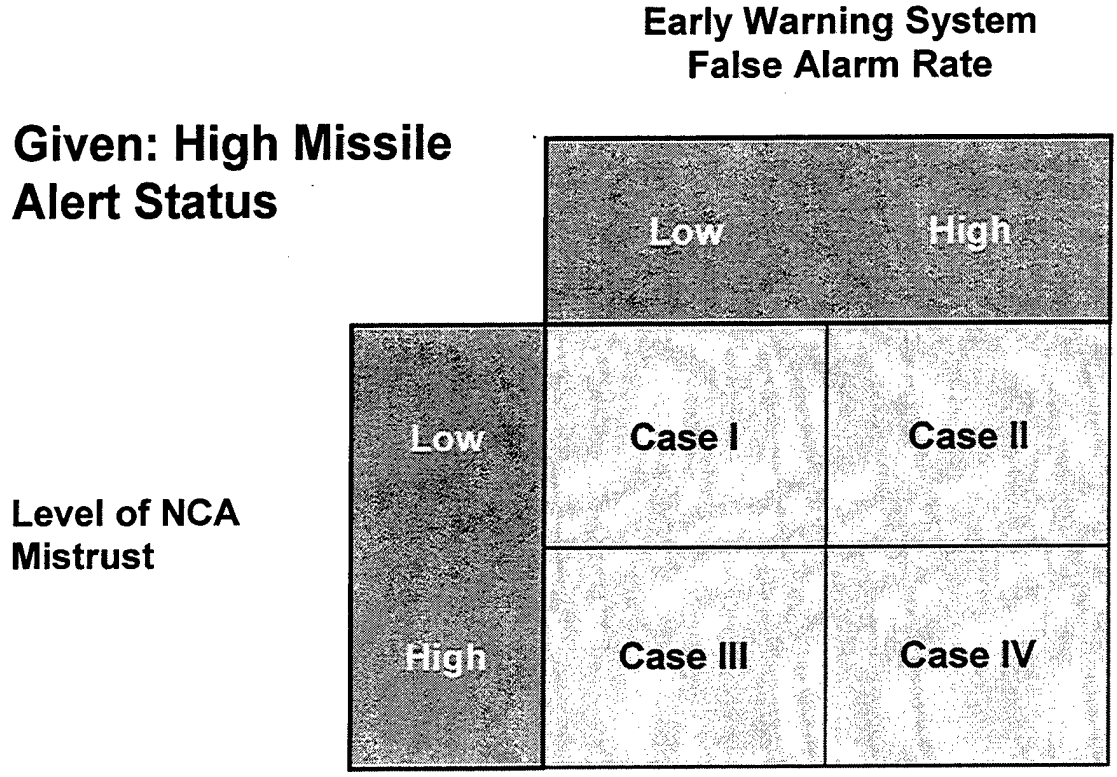


**Figure 2: Relative Chances of a Nuclear Missile Launch from a False Alarm**

Case I represents a low level of NCA mistrust and low false alarm rate. Case II represents a low level of NCA mistrust and high false alarm rate. Case III represents a high level of NCA mistrust and low false alarm rate. Case IV corresponds to the de-alerting proponents' claim that the current situation involves a high level of Russian NCA mistrust and high false alarm rate condition.

The "result" or output for each case is an assessment of the relative (high or low) likelihood of a Russian missile launch for each of these combinations. This thesis concludes that the argument that there is a high likelihood of Russian missile launch under the current conditions of mistrust and early warning system alarms is incorrect. Thus the initial assumptions that would provide the rationale for de-alerting actions are invalid.

The final topic examined in this thesis concerns the options of unilateral versus bilateral de-alerting schemes and the problems with disturbing the nuclear status quo. These problems include the probable behavior of states in a crisis re-alerting race and the possibility of pre-emptive attack.

The effects of de-alerting nuclear forces on crisis situations between the United States and Russia, particularly with respect to the possibility of pre-empting (launching a first strike) during a potential race to re-alert nuclear forces, are untested. One must seriously consider not just expected outcomes in peacetime, when tensions are relatively low, but also during crises, when tensions are high and outcomes less predictable. This thesis considers the differing combinations of alert postures that might exist should one or both countries decide to de-alert. De-alerting proponents generally assume that the United States would take the lead in de-alerting its nuclear missiles, and that Russia would follow. However, they do not examine the possibility that one country might de-alert its missiles without the other following suit. Thus in a crisis the following questions might arise: At what point might national leaders believe

that they had regenerated enough nuclear missile capability to begin using it to threaten or attack the other country? Would an uncontrolled re-alerting race develop?

If the United States de-alerted its nuclear missiles and Russia did not, would Russia use the resulting imbalance in nuclear capability to take advantage of the United States? Richard Ned Lebow has suggested that Russia would not take advantage of the "window of opportunity" based upon a military disparity alone.[7] By contrast, Stephen Van Evera posits that "war is far more likely when conquest is easy, making an imbalance in alerted forces more problematic."[8]

## D. LIMITATIONS

The de-alerting proposals are based upon U.S. systems. The analysis of these proposals thus focuses primarily on U.S. systems. The de-alerting proponents assume that Russian systems, having evolved in parallel with U.S. systems, are similar and thus could be subject to similar physical de-alerting methods. This may not be true. In some areas, we can only speculate on the particular de-alerting methods that might be feasible for Russian systems.

This analysis is based on the conditions that exist today and is not necessarily representative of conditions in the future. Moreover, because the de-alerting proponents have focused on two countries, this thesis is restricted to a

[7] Richard Ned Lebow, "Windows of Opportunity: Do States Jump Through Them?" *International Security* 9.1 (Summer 1984), 149. These issues are discussed at greater length in Chapter V of this thesis.
[8] Stephen Van Evera, "Offense, Defense, and the Causes of War," *International Security* 22.4 (Spring 1998), 5.

discussion of U.S.-Russian nuclear relations. Prudence would dictate that the United States and Russia continuously evaluate the conditions of nuclear balance, not just between themselves but with other nuclear and potential nuclear states as well.

Finally, despite the end of the Cold War, current data about early warning system performance as well as official accounts of decision-makers' actions remain classified. Much of the available literature on nuclear system problems comes from decades-old de-classified accounts that may not be accurate characterizations of current nuclear system performance.

## E. CHAPTER OUTLINE

Chapter II presents specific de-alerting proposals, examines their feasibility, and discusses possible verification methods. Chapter III addresses the beliefs and attitudes of Russian leaders toward the United States that might affect Russian behavior in response to a false or ambiguous missile attack warning. Chapter IV examines past false or ambiguous early warning system alerts and characterizes the "hair-trigger" descriptor. Chapter V discusses the potential for Russian reciprocity should the United States take the lead in de-alerting its missiles and the potential problems created by a re-alerting situation in a crisis. Chapter VI presents the conclusions of the study.

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## II. THE DE-ALERTING PROPOSALS: FEASIBILITY AND PROSPECTS FOR VERIFICATION

The concept of de-alerting nuclear forces is one of several possible initiatives often proposed for reducing the chances of an accidental nuclear launch or exchange. This chapter briefly examines past actions designed to reduce the chances of an accident, and then reviews the current issues that de-alerting proponents identify and the solutions they consider necessary for preventing an accidental nuclear war. This chapter then examines several of the key proposals and identifies potential problems in nuclear operations that the de-alerting efforts may cause.

### A. PREVIOUS ACTIONS TAKEN TO REDUCE THE CHANCES OF AN ACCIDENTAL NUCLEAR WAR

#### 1. Forces Stand Down

President George Bush ordered a series of unilateral U.S. nuclear operations changes in 1991 following the attempted coup against Soviet President Mikhail Gorbachev. These actions included eliminating the U.S. ground-launched tactical nuclear weapon inventory and removing tactical nuclear weapons from naval combatants, including submarines. Bush ordered all strategic bombers removed from alert status. The nuclear bombs and cruise missiles for these aircraft were placed in storage.[9] These actions may have helped to reduce some Russian nuclear fears by taking away certain short range

[9] Kathleen C. Bailey and Franklin D. Barish, *De-Alerting of U.S. Nuclear Forces: A Critical Appraisal*, Available Online: http://nuclear-security

nuclear threats to Russian territory. U.S. bombers, once airborne, could be detected and considered as a potential threat to Russia. During the Cold War fighters and airborne command posts were occasionally launched in response to missile attack warnings, all of which turned out to be false. Additionally, several bombers on airborne patrols suffered crashes or inadvertently dropped weapons. Fortunately, none of these accidents resulted in a nuclear detonation, although the conventional explosives in several dropped weapons did explode.[10] With the Cold War over, President Bush apparently reasoned that the United States needed to reduce the risk of a nuclear accident or of Russian misperceptions of U.S. intentions. Ordering the bombers off alert status seemed to be a good start at reducing the risk of inadvertent war, and offered significant financial savings.

**2. De-Targeting**

In October 1994, Presidents Clinton and Yeltsin reached an agreement to stop "targeting" missiles at each other's nation. Targeting was defined as conducting missile drills using target coordinates located within the other country's territory. De-targeting programs a missile to fly to coordinates at sea outside a specific country. "Zero-targeting" is a special condition in which no target coordinates are loaded into the missile guidance system. In the *1994 Moscow Declaration* Presidents Clinton and Yeltsin agreed that the United States and Russia would stop conducting drills with nuclear missiles targeting one another. This arrangement was meant to allay two concerns. One was that

[10] Sagan, *The Limits of Safety*, 156 and 178; Feaver, *Guarding the Guardians*, 207.

countries on friendly terms should not continue to target each other due to the force of bureaucratic inertia. The second concern was a fear of a drill missile accidentally being launched. If the missile was programmed to fly to coordinates in the other country, it might lead to an accidental nuclear detonation.

This de-targeting arrangement had more political than technical support on both sides. As Bruce Blair points out, although a missile guidance system memory can be cleared of its flight plan in compliance with the 1994 agreement, it takes but a few seconds or minutes to re-program the missile and send it toward its original target. The guidance programming on some Russian nuclear missiles cannot be permanently cleared, and in the absence of overriding target information, the missile will fly to its originally programmed target in the United States.[11]

### 3. The Call for Abolition

In December 1996, sixty retired flag officers from seventeen nations jointly called for a complete abolition of nuclear weapons.[12] Two prominent U.S. figures at the forefront of this movement were retired Air Force General George Lee Butler, a former commander of the U.S. Strategic Air Command, and retired Army General Andrew Goodpaster, a former NATO commander who also had been a key advisor to Presidents Eisenhower, Nixon, and Carter. In spite of the apparently strong backing among those who had served in their countries'

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[11] Blair, "Taking Nuclear Weapons Off Hair-Trigger Alert," 80.
[12] George Lee Butler, "Time to End the Age of Nukes," *Bulletin of the Atomic Scientists*, 53.2 (1997): 33-34.

militaries, the proposal did not have widespread acceptance in the American and Russian governments. These governments have relied instead on reducing their nuclear forces through a series of early retirements of certain systems that would have been eventually eliminated by the Strategic Arms Reduction Talks (START). None of these early reductions amounts to a complete abolition of nuclear weapons. Abolition remains the goal of the Canberra Commission and various other non-government organizations (NGOs) and advocacy groups.

## B. NUCLEAR ALERT STATE IN A POST-COLD WAR WORLD

Nuclear weapons alert state refers to launch readiness, usually in terms of a specific material condition or time readiness for launch. For nearly the entire duration of the Cold War both the United States and the Soviet Union maintained their forces in a high alert state, with missiles readily programmable and ready to fly on extremely short notice. Russia and the United States still do so today.

In 1997 Bruce Blair, a Senior Fellow with the Brookings Institution, appeared before the House National Security Subcommittee on Russia's nuclear forces situation. He stated that "Russian control over its nuclear arsenal is tottering on the brink of collapse" and that "it is not at all unreasonable to anticipate a catastrophic failure of Russian nuclear command and control."[13] Frank von Hippel of Princeton University fueled the debate two months later,

[13] Bruce G. Blair, "Statement of Bruce G. Blair before the House National Security Subcommittee, 13 March 1997," Available Online: http://www.nukefix.org/97-3-13Blair.html

calling for an end to what he called U.S. and Russian "hair-trigger" alert status and command and control postures.[14]

## C. THE "PROBLEM" WITH U.S. MX AND TRIDENT II MISSILES

According to de-alerting proponents, the land-based W87 MX and the sea-based W88 TRIDENT II missile warheads represent the greatest threats to the Russian nuclear arsenal and cause the Russians the most worry. High missile accuracies and high yield warheads make the MX and Trident II missiles a counterforce system assessed by the Russians as able to destroy their command and control centers and ICBM silos. This threat, the de-alerting advocates assert, convinces the Russians they must "use-or-lose" their missiles—that is, launch on warning instead of launching under attack or not at all.[15] According to the theory propounded by advocates of de-alerting, taking away the powerful W87 and W88 warheads from immediate launch availability would allow the Russians to lower their reliance on a launch on warning philosophy. It would also remove the supposed "hair-trigger" stance that, de-alerting proponents say, puts the United States and Russia on the brink of nuclear war.[16] (The accuracy of the "hair-trigger" phrase is analyzed in Chapter IV.)

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[14] Frank von Hippel, "Paring Down the Arsenal," *Bulletin of the Atomic Scientists*, 53.3 (1997): 33; Frank von Hippel, "De-Alerting," *Bulletin of the Atomic Scientists*, 53.3 (1997): 35.
[15] Bruce Blair, Harold Feiveson, and Frank von Hippel, "De-Alerting Russian and American Nuclear Missiles," *UNIDR Newsletter*, 38 (1998): 20.
[16] Bruce G. Blair, *The Logic of Accidental Nuclear War* (Washington DC: Brookings Institution, 1993).

## D. THE "SOLUTION"—DE-ALERT NUCLEAR FORCES

The proposed de-alerting methods would make launching strategic nuclear missiles more time-consuming for a "shooter" and thus less threatening to an "adversary." The proposed solutions include removing warheads from missiles and storing them in separate facilities, removing critical guidance system circuitry, replacing high-yield warheads with lower-yield warheads, and moving U.S. submarines out of immediate striking range of Russia. These are but a few of the de-alerting proposals, which appear in Figure 3. In contrast with de-targeting, which affects the chances of an accident, de-alerting proposals are intended to lessen the risk of nuclear attacks without sufficient deliberation and to eliminate doubt about ambiguous indicators of attack.

**Category I (Accuracy and Lethality Measures)**

| United States | Russia |
|---|---|
| Immediately remove to storage 500 W87 MX missile warheads.<br><br>Take the W88 warheads off the Trident II missiles, place those warheads in storage and replace them with lower-yield W76 warheads.<br><br>Remove the guidance sets from the missiles and store them on board. | Remove the warheads from all 46 SS-24 rail- and silo-based missiles (which will, in any event, be retired under START II).<br><br>Remove essential in-flight batteries from silo-based and mobile land rockets.<br><br>Russian mobile land rockets could be taken out of their garages and faced south to prevent their rapid firing in a northerly direction (i.e., toward the US). The erector launchers could also be put on blocks with their tires removed. |

**Figure 3: Proposed De-Alerting Methods**[17]

[17] Figure 3 is adapted from Blair, "Taking Nuclear Weapons Off Hair-Trigger Alert," 81; and Bailey and Barish, "De-Alerting of U.S. Nuclear Forces: A Critical Appraisal."

**Category II (Weapon Availability Measures)**

| United States | Russia |
|---|---|
| Place heavy objects on silo doors and remove the explosive charges that are designed to blow the lids off the silos prior to launch.<br><br>Cover the silos with 20 meters of earth, so that the doors cannot be opened without removing the weight.<br><br>Disable all Minuteman III missiles by pinning open their safety switches.<br><br>Put all U.S. ballistic-missile submarines at sea on a low level of alert, so that it would take at least 24 hours to prepare them to launch their missiles, and keep most submarines out of range of Russian targets by heading south on patrol.<br><br>Remove to storage the warheads on the eight Trident submarines that are to be retired under START III and reduce the number of warheads on each remaining submarine missile from eight to four.<br><br>Replace the downloaded warheads with heavy compact objects permanently fixed to the missile post-boost vehicles to assure that critical targets in the Russian Federation remain out of missile range when the submarines sail south. | Install structures so that truck-mounted missiles could not be launched out of their garages.<br><br>While in their garages, mobile rockets could be prevented from launching on warning by setting up large heavy metal beams above the sliding roofs of the garages.<br><br>Immobilize all other silo-based missiles that are to be retired under START II.<br>Place all ballistic-missile submarines (in port and at sea) in a condition such that their missiles could not be launched for at least 24 hours.<br><br>Separate and put in storage the warheads from its vulnerable submarine missiles on dockside alert poised for immediate launch.<br><br>Remove the warheads from the 15 ballistic-missile submarines most likely to be retired under the START agreements. |

**Figure 3 (cont'd): Proposed De-alerting Methods**

De-alerting proposals deal with two general concerns. The first group of proposals (Category I) addresses worries about the highly accurate W87 and

W88 warheads. The proposals would remove the warheads from ready service so that the U.S. nuclear arsenal would no longer have prompt launch capability against Russian nuclear forces. Thus the Russian launch on warning tendency claimed to exist by the de-alerting proponents would be greatly reduced.

The second group of proposals (Category II) addresses the time constraints that decision-makers must face when confronted with the short flight times of sea-launched ballistic missiles in relatively close proximity to their targets or abbreviated warning time during a land-based missile attack. Gaps in Russian early warning satellite and land-based radar systems could worsen these conditions of minimal warning and decision time. As the de-alerting proponents point out, a sudden indication of an unexpected launch from the sea or sudden appearance of an ICBM would place Russian decision-makers under severe time constraints. This stress, combined with the "use-or-lose" mindset, could cause Russian decision-makers to make a precipitous decision to counterattack without having a full accounting of the attack warning validity. The proposed de-alerting measures in this group would make such an intensely time-constrained situation less likely, in theory lessening the probability of a decision to launch on warning. These measures would make the land- and sea-based launch systems harder to use by physically extending the time to launch readiness. These methods would require some sort of sensing system to ensure compliance. Disturbances in the sensors might give adequate warning to Russia that missile launch preparations were taking place.

As the de-alerting proponents are quick to point out, many of the proposals in Figure 3 were designed based upon known characteristics of the U.S. systems. Equivalent actions that could be taken by Russia appear next to the U.S. actions.

## E. BLUNTING THE SWORD: DE-ALERTING MISSILES AND THEIR LAUNCH PLATFORMS

The effect of degrading a launcher system or missile from its full military capability could be seen as "blunting" or "dulling the sword." These measures include capability reductions that may occur under START II or III, but ultimately represent what the de-alerting proponents really want—an early abolition of all nuclear weapons. Thus, the de-alerting proponents only enter into limited arguments about the utility of nuclear weapons, which could include deterrence, flexible response, countering weapons of mass destruction, and retaliatory capability.

### 1. De-alerting the Land-based Forces

#### *a) Remove ICBM Warheads and Transfer them to Storage*

The first proposal for land-based missile de-alerting would remove ICBM warheads and place them in storage. This action is superficially similar to START II, which requires converting multiple warhead ICBMs into single-warhead ICBMs. The START II Treaty has been ratified by the U.S. Senate but still faces apparently insurmountable opposition in the Russian Duma.

Removing the warheads is certainly possible. Indeed, reductions in warhead loads are required with regard to multiple warhead ICBMs if START II

enters into force. If U.S. policymakers wanted to follow the recommendations of the de-alerting advocates, they would have to decide whether to place all of the removed warheads in centralized or dispersed locations. Placing all of the removed warheads in one or several centralized locations would permit easy on-site verification, as called for by the de-alerters.[18] Inspectors would only have to visit a few centralized sites to fulfill their responsibilities, according to one of the de-alerting proposals. Security against some threats would be relatively easy to achieve, with all of the warheads located within known physical boundaries. Protection forces would be concentrated and focused with a clear picture of the storage sites. This scheme would only work if all warheads were declared and their locations known. There is much doubt concerning Russian warhead accountability as well as the possibility that some undeclared warheads might be held in undisclosed locations, ready to be re-mated during a crisis.

The stored warheads would, however, be a lucrative target for any nation or group contemplating a first strike. A potential aggressor would only need a few warheads of its own to destroy many U.S. warheads.[19] Even a rogue nation with a modest nuclear weapons stockpile could destroy or contaminate a warhead storage site. This storage arrangement would give an aggressor an advantage over the United States by making it easy to attack and eliminate part

[18] It should be noted that START II inspections would not confirm that warheads removed from SLBMs and ICBMs remained in storage. START II inspections would only verify the number of warheads on START-accountable ICBMs and SLBMs.
[19] Walter Slocombe, "Is There Still a Role for Nuclear Deterrence? " *NATO Review*, 45.6 (1997): 26.

of the U.S. nuclear arsenal. It would severely damage the U.S. retaliatory posture and hence the credibility of its threats to retaliate.

Placing the de-alerted warheads in dispersed locations would make them more secure from attack by an aggressor with a limited number of nuclear weapons, but both security and verification would be more difficult. Warheads in dispersed locations might be more vulnerable to theft and tampering during periods between verification inspections. Security could be a problem, since guarding a greater number of storage sites would require correspondingly higher numbers of security force personnel. Establishing new security teams might take large expenditures of training time and money. From a stability standpoint, however, a potential aggressor might be less likely to attack a large array of dispersed storage sites. If a situation required re-alerting nuclear weapons, U.S. forces would require a long time (due to transportation distances from many storage sites and the limited availability of safe and secure transportation means) to return the warheads to their missiles. In comparison to the strategy of storing all of the removed warheads at a single site, a nuclear attack against dispersed storage locations could become less likely—and would certainly require more forces. However, if it was discovered that security was insufficient (by detecting tampering or theft), the United States might attempt to recall the warheads and re-arm the land-based missiles again to protect the warheads. This could be destabilizing, as a "re-alerting" race could quickly develop; it would be hard to

convince another state that issues of internal security demanded what would amount to a rapid generation of nuclear forces.

The other matter of concern is START II itself. While the U.S. Senate has voted in support of a resolution of ratification, the Russian Duma has not, and may not do so anytime soon. Politically, any U.S. action to take warheads off MX or Trident II missiles before the Russian Duma votes to support START II ratification would be seen by U.S. leaders as premature and unwarranted, because it would reduce Russian incentives to ratify START II.

### *b) Pin Open ICBM Safety Switches*

The act of pinning open safety switches would disable the electrical circuits that allow the launch signals to reach nuclear-armed missiles. It would in a sense replicate the alert stand down action taken by the United States regarding U.S. ICBMs scheduled for deactivation under START I, a step ordered by President Bush in September 1991. Opening the safety switches would require silo entry by the missile technicians. It could take hours for the teams to reach the critical circuitry, physically open the switches, and exit the enclosures of each missile. It would take a similar amount of time to restore the switches and re-enable the missiles for launch. This de-alerting method could be used to disable temporarily approximately 500 Minuteman III missiles, amounting to 1500 warheads.

The safety switch option would be physically much easier to accomplish than physically removing warheads to storage. It would also obviate the need for separate storage facilities and their associated security forces.

The challenge in this de-alerting method would lie in verification. If verification teams required a physical inspection of the safety switches, they would have to enter each of the silos containing the ICBMs to perform their duties. This would require an extraordinary amount of time and travel while going from silo to silo. It would probably be an expensive and continuous inspection process. Ensuring that land-mobile ICBMs remained de-alerted would add another dimension to the verification complexity. Another possible verification method not involving physical inspection teams would be by using remote sensors inserted into the disabled circuit. The sensors would send a signal back to the verifying country by satellite or various landline services indicating that the safety switches remained undisturbed.[20] One problem with this method is the possibility, however small, of defeating or overriding the sensor systems. A stronger possibility is that interruptions in the satellite or landline service would suddenly leave the verifying country blind to actual conditions at the silo. Backup systems would have to function properly to prevent or moderate this potentially unstable nuclear security condition.

[20] Garwin, "De-Alerting of Nuclear Retaliatory Forces."

### *c) Place Heavy Objects on Silo Doors*

Several different proposals address temporarily disabling the silo doors, which must be opened to launch silo-based ICBMs. Bruce Blair and former U.S. Senator and Chairman of the Senate Armed Services Committee Sam Nunn have suggested placing heavy objects on top of the silo doors and removing the explosive charges that would normally blow the doors open during the launch sequence.[21] Richard Garwin proposes a messier solution. His method of disabling the silo doors would include piling twenty meters of earth on top of each door, so that removing it would require bulldozers and time.[22]

There are several potential problems with these methods, all dealing with operability of the silo doors after removing obstructions. The weight of the objects placed on the doors could buckle or jam them, permanently disabling the silo. Although the doors are designed to withstand high overpressure and weather elements, no one knows how much weight could disable yet not cause permanent damage to a silo door. In the case of dirt used as the disabling medium, the weight of the bulldozer would also have to be taken into account as potentially damaging to the silo doors. Dirt could also have another detrimental effect if it entered the mechanisms that operate the doors. It might render inoperable the sliding, rotating, and pivoting joints that cause the doors to open.

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[21] Bruce Blair and Sam Nunn, "From Nuclear Deterrence to Mutual Safety: As Russia's Arsenal Crumbles, It's Time to Act," *The Washington Post*, 22 June 1997: C01.
[22] Garwin, "De-Alerting of Nuclear Retaliatory Forces."

The verification methods for ensuring the doors remained covered could consist of remote sensors sending signals to the verifying country, overhead satellite imagery, on-site inspections, or a combination of these methods. The problems with remote sensors and on-site inspections remain similar to those examined in the safety switch case. Overhead imagery may suffer from insufficient satellite coverage over the verification sites or intermittent weather conditions obscuring the satellite view. Any of these interruptions in verification information could create an unstable nuclear security situation.

This proposal of disabling silo doors would require the greatest overall amount of design effort and time to implement. The forces performing the de-alerting by placing heavy, immobile weights or earth on top of the silo doors would probably insist on a test of an empty silo to verify the idea's feasibility. Because of the expense, time, and design issues involved, this de-alerting method would probably be the least likely to be used.

### 2. De-alerting Sea-Based Forces

#### *a) Reduce the Number of Submarine Warheads*

De-alerting proponents suggest following a two step reduction in the number of available U.S. SLBM warheads. The first reduction, already planned under START II, would entail eliminating four of the eighteen nuclear-powered ballistic missile submarines (SSBNs) currently in service while reducing the number of warheads on each remaining SLBM from eight to five—a potential

interim reduction of 1,776 warheads.[23] They propose a further reduction to meet what they believe to be START III goals. This reduction would eliminate another four submarines and an additional warhead from each remaining missile, or another 720 warheads.[24] De-alerting proponents would accomplish both reductions immediately instead of working to the current START deadlines.[25]

Removing the SLBM warheads from service and permanently storing them on land would be a relatively easy task. Verification teams could observe empty launch tubes as well as the removal of the mechanical and electronic systems that supported the SLBMs. Much of the submarine, however, would remain intact. The disposition of the submarines retired early from missile service would have to be handled by the U.S. Navy, since the launch platform would still exist and could conceivably be used for nuclear missile service. Several options exist for employment outside the ballistic missile service (such as traditional nuclear attack submarine (SSN) duty, for instance) but measures would have to be taken to ensure the missile tubes remained free of nuclear ballistic missiles. Verification teams could inspect the downloaded submarines during scheduled stops in port.

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[23] Removing four SSBNs from service would reduce the total number of warheads by 768 (four submarines, 24 missiles per submarine, and eight warheads per missile). Fourteen SSBNs would remain, allowing an additional reduction of 1008 warheads (fourteen submarines, 24 missiles per submarine, and three removed warheads per missile). Total: 1776 warhead reduction under START II.

[24] Removing another four SSBNs from service would reduce the total number of warheads by 480 (four submarines, 24 missiles per submarine, and five warheads per missile). Ten SSBNs would remain, allowing an additional reduction of 240 warheads (ten submarines, 24 missiles per submarine, and one removed warhead per missile). Total: 720 warhead reduction under START III.

[25] Blair, Feiveson and von Hippel, "Taking Nuclear Weapons Off Hair-Trigger Alert," 76.

America's willingness to de-alert its SSBNs, particularly in the face of the Russian Duma's reluctance to ratify the START II agreement, would probably be non-existent. This unwillingness to de-alert is a position held by those who favor retaining some measure of nuclear deterrence and retaliatory capability, particularly from the most survivable leg of the U.S. nuclear triad. The question of what to do with the submarines that had not served their design lifetime would also play heavily in U.S. deliberations.[26] U.S. Navy and political leaders would have to decide whether to employ the taxpayer investment (in a multi-billion dollar submarine with time remaining on its life cycle) in non-strategic missions, or to scrap the hull.

There also are differences in how Russia and the United States structure their nuclear forces. In spite of their parallel development of triads of nuclear delivery systems during the Cold War, there are asymmetries between Russian and U.S. forces. Russian nuclear forces are primarily land-based ICBMs. Russian submarine numbers have been dwindling as a result of shortages in maintenance funds. They cannot go to sea to be the survivable equivalent of the U.S. SSBNs. As a result, the Russians have higher numbers of nuclear warheads on ICBMs while the United States has higher numbers of nuclear warheads in submarines. The greater number of U.S. nuclear warhead reductions are in the submarines—in order to maintain relatively equal strength in

[26] Leon Sloss in Bruce Blair and Leon Sloss, "Avoiding Launch on Warning," *Transforming Nuclear Deterrence* (Washington DC: National Defense University Press, 1997): 20.

ICBMs and SLBMs (as well as strategic bombers) and keep the nuclear triad balanced.

Thus, while physically removing warheads from SLBMs might be relatively easy, this proposal would likely face stiff opposition from U.S. military and political decision-makers. They would see this as an ill-advised move toward significantly weakening U.S. nuclear strength, undermining deterrence, and eliminating prompt retaliatory capability. The latter result is in fact the outcome favored by advocates of de-alerting.

### *b) Change to Lower Yield Warheads*

According to U.S. advocates of de-alerting, the W88 warhead carried on the D-5 Trident II SLBM causes the Russians considerable worry and pushes them to favor a launch on warning strategy. De-alerting proponents would remove the W88 warheads and place them in storage. The empty spots on the warhead bus would be filled with the lower yield W76 warheads, still in service and deployed on the Trident I SLBM.

Replacing the W88 warheads with another model might involve some mounting changes and ballistics calculations for missile flight, but the physical change could be relatively easy to accomplish. The W88 warheads would be transferred ashore where they would either be stored or dismantled, with the components applied to other purposes. The same arguments presented for storage, security, and verification of ICBM warheads would apply here. A

potentially destabilizing condition could result if the United States stored all of the removed warheads in one or only a small number of locations.

Planners also would have to consider the possible negative effect upon deterrence strength and nuclear striking power. How many nuclear missiles would it take for deterrence to work and how much nuclear striking power would it take to retaliate? The de-alerting advocates might argue that just a few well-hidden warheads at sea could provide sufficient deterrence. A country contemplating a first strike on the United States might be deterred by the prospect of unacceptable damage upon its homeland in retaliation. For retaliatory striking power, the U.S. might need a good number of missiles to remain in service to achieve a certain level of damage. Political and military considerations thus drive "acceptable" force levels. These are difficult issues, but it is likely that the military and political planners would require large numbers of nuclear warheads available for immediate use to meet the target coverage guidelines established by the U.S. National Command Authority (NCA).

### *c) Patrol in Areas Outside Range of Russian Targets and Put Dead Weights in Place of Some Warheads*

This proposal would have the United States announce that its SSBNs would sail south of their normal patrol areas and out of missile range of Russian targets. The submarines would be at least a day's cruising distance from being in range. Additionally planners would have to account for the effect of downloading some warheads from the missile post-boost vehicles upon achievable flight distance from the submarine. Removing some warheads could

result in extremely long missile ranges that would make patrolling outside target range nearly impossible. De-alerting proponents in this case would place heavy, compact, and inert (non-explosive) weights in place of the removed warheads. This would ensure that Russian targets remained out of range.

Cruising to the south of assumed normal patrol areas would certainly be possible. An announcement by the United States that it intends to send its ballistic missile submarines to the south, however, might be a statement that Russia would find hard to accept without cooperative assurances and constant, real-time verification. It would take a large amount of faith on the part of Russian decision-makers to accept the United States commitment without a verification arrangement. An announcement such as this could be met with healthy skepticism at a minimum, with outright rejection more likely. Verification would be difficult. As de-alerting proponents admit, "mobile systems such as submarines and truck-mounted missiles could not be monitored continuously...when away from their home bases because such monitoring would compromise their survivability."[27] This reduction in survivability would reduce crisis stability. If SSBNs at sea with fewer or lower-yield warheads were recalled to port for uploading with more or higher-yield warheads, this could result in a greater risk of attacks against U.S. SSBNs in port. As General Habiger

[27] Blair, "De-Alerting Russian and American Nuclear Missiles," 22.

points out, "In port, a ballistic missile sub is potentially one of the most destabilizing weapons since it is an extremely lucrative target...."[28]

At-sea verification is a difficult hurdle for the de-alerting effort. De-alerting proponents have proposed several options. Richard Garwin describes an elaborate scheme whereby Russia, the verifying state, would send a coded request to the United States, the patrolling state. The United States would use its communication circuits to order its SSBN from cruising depth to satellite communications depth (periscope depth). At a pre-arranged time in the coded messages, the U.S. SSBN would then receive a coded interrogation signal from a certain satellite, formulate a coded reply and position report, and retransmit it within a given time limit. GLONASS or GPS would determine its position. Several satellites could receive the submarine's transmission and, through signal analysis and triangulation, independently derive the submarine's position. The verifying country could use this derived position as a check on the submarine-reported position.[29] The disadvantages in this method are the elements of time and survivability. The verifying country would have to accept the limitations of not being able to conduct on-site verifications by its own people, and would additionally require a waiting period between the request and response. This delay might be unacceptable in the case of an early warning system alert that

[28] Eugene E. Habiger, "Strategic Forces for Deterrence," *Joint Forces Quarterly*, Winter 1996-1997: 68.
[29] Garwin, "De-Alerting of Nuclear Retaliatory Forces."

requires immediate validation. The destabilizing result might be Russian recourse to an ICBM launch on warning posture.

Both supporters and opponents of this type of a de-alerting verification scheme acknowledge the negative effects upon submarine, and thus launch system, survivability. De-alerting proponents therefore suggest using an expendable radio buoy system to transmit the coded signals to the verifying and patrolling countries. Launchable from the SSBN at pre-arranged intervals, the buoys would have a time delay set to allow the submarine to place distance between itself and the buoy before it started transmitting. If the verifying country decided to use the intercepted information as a way of targeting the SSBN, it could only direct its attacking platform (such as another submarine or hunter-killer aircraft) to a known past SSBN position.

There are several problems with this method, as de-alerting opponents acknowledge. First, there would be a question as to how many of these special buoys would have to be carried on board. With space at a premium on a submarine, a reporting requirement of up to perhaps four times per day over the period of a sixty to ninety day patrol would require up to 360 buoys. The actual reporting frequency would have to be negotiated between the United States and Russia, and would have to be sufficient to satisfy the verifying country that the SSBN remained out of range. The space that would be required for storing these buoys would probably mean foregoing some other vital pieces of equipment. The buoys also would have to be engineered to be one hundred

percent reliable, or nearly so. Buoy failure would mean a missed verification report, and some kind of backup system that would have to activate and let the submarine know to launch another buoy or come to periscope depth to make its report by other means. This would take time and could invoke the same level of anxiety and destabilizing tensions as an early warning system alarm.

Another method proposed by Garwin could be a towed buoy system, tethered to the submarine, which could transmit in real time the status of any electronic sensors monitoring missile status on-board as well as the submarine's position. The buoy would be dragged through the water by the submarine by an electrical or fiber-optic cable, and separated from the submarine by perhaps tens of kilometers. This would help allay some of the survivability fears expressed by opponents of this method, but probably not by much. Additionally, there would be considerable design effort to ensure the system remained physically tethered to the submarine. Towed devices have frequently been severed by the submarine's own screw or a passing ship's propellers. Some could be snagged in fishing lines or nets. Some devices could not withstand the drag forces that could break the tow cable and/or cut off the signals between the submarine and the buoy. In any of these cases the result would be an interruption of the verification signals similar to the failed buoy.

Both of these active transmission types of verification schemes completely ignore submarine detectability in the interest of verification. Whether the submarine makes these transmissions via direct communications from

periscope depth, time-delayed radio buoys, or a continuously tethered buoy, a verifying country could still use the information over time to derive the SSBN's patrol area. Transmitting by any means would forfeit the submarine's designed advantage of stealth. Thus, no matter how much the de-alerting proponents claim that these methods are benign, SSBN survivability would always decline. U.S. political and military leaders are unlikely to accept this condition of de-alerting.

This de-alerting method also assumes that submarine-launched SLBMs, like ICBMs, always fly a trajectory over the North Pole. While it may be a valid assumption for land-based missiles, it may not be true for SSBNs, which can launch from practically any geographic azimuth to their targets on a depressed trajectory.

This brings the discussion to the second measure in this proposal—that is, to remove actual warheads from post-boost vehicles (the "warhead bus") and replace them with compact weights. The downloaded warheads would be an early compliance with START II and possibly START III frameworks. The extra weight in their place would in theory limit the distance that a booster could carry its nuclear payload. The foreshortened range would help guarantee that U.S. missiles could not reach Russian targets. Although detailed calculations would have to be made to determine its effect upon flight characteristics and range, the method seems feasible. U.S. ballistic missile submarines would thus not have to patrol quite as far south. Verification of these actions would be on an easy, one-time basis by on-site inspectors while the submarine is in port, and timed in such

a way that real warheads could not uploaded onto the missiles in the dummy positions before sailing. Underway survivability of the SSBN would be unaffected if this were the only scheme employed. Arguments against this action would come from those who favor deterrence based on a threat of overwhelming retaliation and who would therefore object to reducing the nuclear arsenal's capability.

## F. VERIFICATION CHALLENGES

It is generally not sufficient to take major arms control actions and expect that other countries will accept simple reports of accomplishment. Verification has traditionally been the prescribed means of building and maintaining confidence in each party's compliance. The preceding section identified several ways in which de-alerting verification might be accomplished. It is, however, difficult to design a verification regime promising one hundred percent confidence that the parties would remain de-alerted.

Perhaps the most accurate method would be that of physical inspection. Teams of trusted agents could perform on-site inspections of launch platforms and missile preparation facilities. The teams could be comprised of experts from the inspecting country, such as Russia inspecting the United States, or American experts inspecting Russian facilities. Alternatively, inspection teams could be comprised of experts from third party countries or even a combination of the host countries with third party countries. The overarching requirement would be the

amount of trust that the de-alerting countries would have to place in the inspection agents.

The advantage of a direct physical inspection would reside in the accuracy of the reports and perhaps in an ability to detect peripheral non-compliance activity that might otherwise go unnoticed by remote sensing systems. It would lessen the possibility of remote sensing systems being defeated and thereby failing to detect illegal activity. The disadvantages could include coverage and timeliness. Cheating or non-compliance could take place in an area not being inspected. Putting together the requisite number of teams to provide full-time, all-site coverage would probably be nearly impossible. Additionally, the challenge of fashioning an inspection team for verifying compliance on a submarine at sea is immense. The direct verification scheme would thus be limited in its overall effectiveness.

While some inspections might go quite smoothly, others might be considered highly intrusive. If one state suspected the other of cheating on a de-alerting agreement, it might demand access through challenge inspections. Refusal to grant access would create crisis conditions.

Remote sensing methods might thus be considered as the primary indicators of continuing compliance by de-alerted states. Remote sensors would offer certain advantages, such as an assumed one hundred percent coverage and real-time data on monitored systems. The disadvantages, however, warrant consideration. Remote sensors may not provide the same level of confidence as

human inspectors. Remote sensors, depending on their sophistication and security, might be defeated or bypassed by a country determined to cheat. It is also difficult to design sensor and communications systems that work one hundred percent of the time. In a situation involving nuclear weapons, with extremely short flight distances and correspondingly short warning times, any signal outage is sure to generate high levels of angst within the monitoring country.

The arrangement for remote sensor employment also might create problems between participants. It might, for example, be difficult for Russia to accept at face value American sensor systems, information derived from those sensors, or offers of U.S. help in eliminating Russian system problems. For example, Russia expressed mixed reactions to the U.S. offer of help to detect and eliminate any "Year 2000," or Y2K, "glitch" risks. The Russian Defense Ministry has been reluctant to allow outsiders to inspect its computers.[30] As another example, suspicion still lingers even after establishing a joint early warning operations center in Colorado that feeds information to Russian systems. The question is whether the Russians will believe the data from Colorado if it conflicts with information coming from their own systems.[31] The Russians also might suspect that the U.S. sensor systems could somehow alter

[30] Michael Gordon, "U.S. Urges Russia to Help Avoid False Nuclear Alerts," *The New York Times*, 22 February 1999, Available Online: http://www.nytimes.com/library/world/europe/022299us-russia-missile.html

[31] Elizabeth Becker, "Russia to Join U.S. in Battle to Ward Off Y2K Debacle," *The New York Times*, 28 October 1999, A14.

or inhibit other functions within the launch or missile system, or within the nuclear warhead.

The ultimate verification regime might thus be a combination of on-site inspectors as well as remote sensing systems. One could thus maximize the advantages that each method offers while minimizing the chances of misperceptions and mistrust that the disadvantages might generate. As the verification arrangements and systems become highly reliable, more complex and tightly coupled, failure could still occur. As Scott Sagan points out, "serious accidents in organizations managing hazardous technologies may be rare, but they are inevitable over time. The belief that intelligent design and management will result in complex organizations that are capable of safely operating hazardous technology is an illusion."[32] Therefore, although each country might desire one hundred percent confidence that the other would remain de-alerted, it is doubtful that such a confidence level would ever be achieved. It is much less likely that a verification regime could ever be developed that would promise that level of confidence. Thus, before entering into a de-alerting agreement, even if done outside a normal treaty protocol, as de-alerting proponents suggest, each country would have to resolve serious verification issues. These issues might well inhibit any attempt at de-alerting.

Finally, it should be recognized that the utility of verification might be overrated. Kenneth Adelman contends that past verification schemes have been

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[32] Sagan, *The Limits of Safety*, 28.

ineffective, primarily because there has been no means to enforce compliance or punish non-compliance.[33] Suppose either the United States or Russia cheated by re-alerting some forces, or did not de-alert to an agreed level. If one discovered the other's non-compliance, there would likely be no clean way of compelling compliance. Complaints and sanctions have traditionally done little to force states to change their actions once a decision has been made to embark on a specific path. Adelman cites instances of Soviet non-compliance with various agreements, including the 1925 Geneva protocol, the 1963 Limited Test Ban Treaty, and the 1972 Strategic Arms Limitation Talks I (SALT I) agreement. The United States did not take much action in response to these Soviet violations. There is little reason to expect this pattern to change.

## G. CONCLUSION

This chapter has presented a brief account of actions taken in the wake of the Cold War's end to reduce the chances of an accidental nuclear war. It has examined the feasibility of the de-alerting proposals, which are intended to reduce the possibility of a nuclear exchange caused by a false or ambiguous warning. The analysis has concluded that the methods are physically feasible, but implementing them could have undesirable effects upon launch platform survivability and crisis stability. Moreover, verification measures could present further problems for U.S. national security.

[33] Adelman, "Why Verification Is More Difficult (and Less Important)," 141.

The proposed de-alerting measures affect only missile launch platforms and missiles. The proposals all involve technical measures that would be relatively easy to implement but much more difficult to verify. The potential negative consequences of pursuing these proposals should be recognized. These negative consequences could include a decrease in launch system survivability in the case of submarines, or the possibility of an uncontrolled move to re-alert in a crisis. In view of the gravity of these problems, "blunting the sword" through de-alerting appears to be an untenable and imprudent proposal. Those who truly believe that the probability of a U.S.-Russian nuclear war is high should consider how to reduce this probability through changes in the Russian decision-makers' beliefs about U.S. intentions; not by disabling U.S. weapons systems. The de-alerting measures could have profoundly undesirable consequences—including, ironically, an increased risk of nuclear war.

## III. RUSSIAN NUCLEAR BELIEFS AND BEHAVIOR

This chapter examines claims that Russian leaders have a deep mistrust of American intentions and believe it plausible that the United States might attack Russia. De-alerting proponents claim that the Russian NCA would probably launch its nuclear missiles on warning, fearing that delay would mean the loss of Russia's nuclear forces and means to retaliate.

It would be inappropriate to predict a Russian response to a missile attack warning by simply mirror-imaging U.S. views and attributing them to the Russian NCA. According to Jack L. Snyder's discussion of Soviet nuclear decision-making in the late 1970s,

> Individuals are socialized into a distinctively Soviet mode of strategic thinking. As a result of the socialization process, a set of general beliefs, attitudes, and behavioral patterns with regard to nuclear strategy has achieved a state of semi-permanence that places them on the level of "culture" rather than mere "policy".... It would be dangerous to assume that Soviet crisis decision-makers will tailor their behavior to American notions of strategic rationality.[34]

Russian leaders are thus affected by their own strategic culture, different in many ways from American experiences. They may exhibit some behavior similar to that of U.S. leaders; but when forced to act in situations where time and survival are of the essence, the actual behavior of Russian leaders may not be what a U.S.-centered view might predict.

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[34] Snyder, "The Soviet Strategic Culture," v.

When presented with a false or ambiguous missile attack warning, would the Russians automatically launch their nuclear missiles against the United States? We do not have a conclusive answer, nor (fortunately) have we experienced any actual Russian nuclear launches against the United States. The best one can do is to assess the likelihood of such a launch in specific sets of circumstances. Examining Russian nuclear strategic culture might provide a partial answer to this policy question. This chapter assumes that the core structure and most personnel of the Russian nuclear weapons system remained essentially the same both during and after the Cold War. Thus many current Russian beliefs may closely follow previous Soviet beliefs about nuclear war. This chapter nonetheless identifies some differences between the Soviet and post-Soviet views.

This chapter assesses whether and to what extent mistrust of the United States still exists and could result in a Russian nuclear missile launch on a false or ambiguous warning. Even if the assessment concluded that a sufficient level of mistrust exists for a launch of Russian nuclear missiles on an ambiguous warning, it would still not necessarily follow that de-alerting would be one of several valid steps toward reducing that danger. If the evidence shows that the Russians are not likely to launch their missiles on a false or ambiguous warning, then de-alerting, with its potentially de-stabilizing consequences, cannot be justified.

## A. MISTRUST AND THE SECURITY DILEMMA

Prior to the end of the Cold War, the security dilemma played a large role in Soviet-American relations. In theory, the actions by one state to improve its defensive posture could be seen by the second state as offensive threats, leading the second state to further improve its defensive posture. This reaction in turn may be seen by the first state as negating its effort to improve its security. There are three possible reactions on the part of the first state. One is to limit any further defense improvements as a way of showing the second state some measure of trust and military restraint. Another possibility is to reduce its defense posture, which would probably lead to a perceived inferiority vis-à-vis the second state. The third possibility is another incremental strengthening of its defense posture and subsequent increase in the two countries' defense programs. In the case of the United States and the Soviet Union, the result was escalation. As Colin Gray observed, the Soviets showed less restraint in the nuclear area and virtually ignored the security dilemma during the Cold War. The Soviet form of enhancing state security was through expansion.[35] This imperialistic, or expansionist, behavior, however, is not unique to the Soviet Union, as Gray was quick to point out. The Roman, British, and Austro-Hungarian empires (among others) all chose to enhance their security through expansion.

[35] Colin S. Gray, *Nuclear Strategy and National Style* (Lanham, MD: Hamilton Press, 1986), 74-75.

The United States also participated in the arms competition, creating nuclear forces roughly equivalent to those of the Soviet Union. Cooperation to mitigate the increases was only marginally successful. The Cold War buildup could have been avoided, but was not. The reason, according to Deborah Larson, was because of the enduring pattern of mutual mistrust between the two countries. The two countries' leaders had "ideological differences, historical baggage, and intuitive mental biases"—in short, different strategic cultures. These differences created lost opportunities for arms cooperation. She claims that the diplomatic failures of the Cold War were avoidable. Cooperative plans between the Soviet Union and the United States only worked when each trusted the other to comply, or when one made a series of unilateral concessions as a way of alleviating mistrust. These successes were infrequent.[36]

In the aftermath of the Cold War, Larson optimistically cites opportunities for cooperation. The de-alerting proposals closely follow many of her recommendations. Larson's plan for establishing higher levels of trust and entering into more effective arms control schemes would include:

- Taking more than one cooperative action, even when the other side does not immediately respond.
- Maintaining a consistent policy.
- Making a series of unilateral concessions.

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[36] Deborah Welch Larson, *Anatomy of Mistrust: U.S.-Soviet Relations During the Cold War* (Ithaca, NY: Cornell UP, 1997), 5-7.

David Twining takes a view parallel to Larson's assessment on cooperation. He praises the fundamental shifts in the nuclear relationship between the United States and Russia. Writing in 1993 after the breakup of the Soviet Union, Twining decided there had been a "complete reversal of the earlier patterns of distrust and rivalry. More than at any other time in history, the lethal capabilities of nuclear weapons have driven both great powers from a position of competition to one of cooperation."[37]

## B. COMPARING U.S. AND SOVIET/RUSSIAN STRATEGIC CULTURES

In the past fifty years the military-industrial systems of the United States and Russia developed in parallel but unequal ways. The resulting nuclear arsenals were produced when leaders followed different deterrence and employment strategies. Differences between the two countries reflect the impact of strategic culture.

Fritz Ermarth summarized the two countries' Cold War nuclear deterrence philosophies. He said that United States doctrine emphasized deterring

> central nuclear war at relatively low levels of arms effort...and strategic anxiety...through the credible threat of catastrophic damage to the enemy should deterrence fail.... The Soviet doctrine stipulated that Soviet strategic forces and plans should strive in all available ways to enhance the prospect that the Soviet Union could survive as a nation and, in some politically and militarily meaningful way, defeat the main enemy should deterrence fail—and by this striving help deter or prevent nuclear war, along with the attainment of other strategic and foreign policy goals.[38]

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[37] David T. Twining, "The New Nuclear Equation," in *Russia and America: From Rivalry to Reconciliation*, ed. George Ginsburg, Alvin Z. Rubinstein, and Oles M. Smolansky (Armonk, NY: M. E. Sharpe, Inc., 1993), 201-202.

[38] Fritz Ermarth, "Contrasts in American and Soviet Strategic Thought," *International Security* 3 (Fall 1978), 138-139.

The United States thus used nuclear weapons to deter a Soviet nuclear attack through the threat of retaliation. The Soviet Union emphasized using nuclear weapons for national survival. How did the Soviet mind and doctrine develop this way, and to what extent do observations of past Soviet behavior apply to Russian decision-makers today?

An important factor in Russian strategic culture is that of a territory highly vulnerable to invasion. As a result, Russians remain constantly on the defensive. Russia suffered repeatedly from hostile invasions due to a lack of natural barriers to outside attack. Battles threatening state security have frequently occurred on Russian soil. By contrast, the United States is protected by oceans to the east and west, good relations with its neighbors to the north and south, and a history of fighting battles abroad rather than on American soil. The Russians feel that they have been constantly threatened, and their military traditions and policies naturally tend to reflect that conviction.[39] U.S. support for allowing Poland, Hungary, and the Czech Republic to join the North Atlantic Treaty Organization (NATO) only served to fuel Russian fears of Western encroachment.

Fear of enemies forms the second element of Russian strategic culture. Robert Bathurst, writing in the early 1980s at a relative peak in the Cold War, described how this fear of enemies affected Soviet society.[40] Both Bathurst and Gray characterized the Soviet practice of inventing enemies as a function of their

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[39] David R. Jones, "Soviet Strategic Culture," in *Strategic Power: USA/USSR*, ed. Carl G. Jacobsen (London: Macmillan, 1990), 38.
[40] Robert Bathurst, "Two Languages of War," in *Soviet Military Thinking*, ed. Derek Leebaert (London: George Allen & Unwin, 1981), 29.

paranoia.[41] The paranoia provided a rallying point and an organizing principle for the Soviet state in general, and the Soviet military in particular. Soviet political leaders promoted fears of external foes to retain power and justify internal control mechanisms. This fear of enemies also affected the military. The press helped complete the spread of fear to the general public by carrying frequent admonitions about spies.

The third factor in Russian nuclear strategic culture is a nuclear inferiority complex. It started long before July 1945, when President Truman first told Joseph Stalin that the United States had developed a nuclear bomb.[42] Soviet efforts under Stalin to accelerate the USSR's nuclear weapons program began in 1942. The events in July and August 1945 led to intensified efforts to break the U.S. nuclear monopoly and reach strategic parity. The Soviets caught up with the United States and surpassed it in rapid order, ignoring, as Gray noted, the security dilemma. The Soviets exploded their first nuclear device in 1949. They launched the Sputnik satellite in 1957 and placed the first man in space in 1961. The pace of Soviet developments, particularly those in space, created a realization in the United States that the Soviet Union was certainly capable of striking the United States with intercontinental ballistic missiles. This was a sign to the United States that stopping the Soviet expansion (and by extension, Communism) would be complicated and dangerous.

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[41] Bathurst, "Two Languages of War," 29; Gray, *Nuclear Strategy and National Style*, 87.
[42] Ermarth, "Contrasts in American and Soviet Strategic Thought," 143.

By most accounts, the Soviet Union reached essential ICBM parity with the United States around 1970. The Soviet nuclear inferiority complex would seem to have diminished, particularly in light of the Strategic Arms Limitation Talks (SALT) and subsequent Strategic Arms Reduction Talks (START) between the two superpowers. These arms control negotiations acknowledged the diminishing returns from increasing stockpiles of nuclear weapons, and the enormous fiscal burdens on each country for building and maintaining the nuclear arsenals.

In the post-Cold War environment, however, nuclear inferiority could again become a strong factor in determining Russian nuclear behavior. Degradations in Russian early warning capabilities as radar facilities in the former Soviet Union (but outside Russia) are shut down could provoke a resurgence of the nuclear inferiority complex. The fear also may grow as Russian leaders confront the costs of maintaining a credible nuclear arsenal.

One might assume that the nuclear arms competition would have stopped or slowed at parity, but numbers aside, there was still a fourth cultural element driving each country's nuclear doctrine—how each country thought about the role of nuclear weapons.

The United States and the Soviet Union developed different approaches to the employment of nuclear weapons and the prospect of nuclear war. American ideas about the consequences of nuclear war has not included the belief in any militarily or politically meaningful form of victory or outcome since the emergence

of mutual assured destruction. This drove the early reliance on maintaining a strong deterrent so that a nuclear exchange would never take place. Conversely, the Soviet system, even in the worst of times, clung tenaciously to the belief that nuclear war must always have a strategic meaning in terms of a rational relationship to the interests of the state. As Ermarth observed, Soviet leaders believed that nuclear war could be winnable.[43] Today, as Russian conventional force readiness declines, Russian leaders frequently allude to the possibility of using nuclear weapons to offset conventional shortfalls. The contingencies the Russians have in mind in this regard appear to be conflicts on Russia's periphery, such as in the Caucasus, in which the opponents would presumably lack nuclear weapons. The principle that links the Soviet doctrine and the current Russian discussions is the notion that nuclear weapons can be operationally useful.

Furthermore, Soviet theorists held that nuclear war must be survivable for the Soviet state and fought for a meaningful purpose. Naturally, victory was the most desirable outcome in any conventional or nuclear war. Gray also noted that the Soviets were traditionally slow to resort to using military force. But when they did do so, it was in great, overwhelming numbers with rapid political results as the desired outcome. Soviet leaders would have had no compunctions about

[43] Ermarth, "Contrasts in American and Soviet Strategic Thought," 144-145.

taking the high military risks involved with nuclear weapons if they saw no alternative to preserving their leadership.[44]

During the Cold War, neither country was willing to take the steps that would put them in a position of being obliged to decide how to limit a nuclear war—that is, they avoided the outbreak of a nuclear war. Ermarth concluded, "for a generation, the relevant elites of both the United States and the Soviet Union agreed that an unlimited strategic nuclear war would be a socio-political disaster of immense proportions."[45] This statement must be carefully considered in the light of sometimes conflicting declarations that define where and when nuclear weapons might be used. For both countries, the declared intentions for using nuclear weapons have been purposefully ambiguous. In these cases, there has been no clear threat that nuclear weapons would be used. By the same token there has been no clear indication that nuclear weapons would not be used.

The Soviet Union's strong reliance upon its nuclear forces, particularly the strategic rocket forces, prevailed until the mid-1980s when Soviet General Secretary Mikhail Gorbachev began de-emphasizing the role of nuclear weapons in Soviet strategy. He realized that the Soviet Union had been pursuing nuclear weapons objectives that were well beyond its financial grasp. Nuclear weapons had placed tremendous strains on the Soviet economy; and Gorbachev believed that diplomacy, and not military might, was the key to advancing his nation's

[44] Gray, *Nuclear Strategy and National Style*, 85.
[45] Ermarth, "Contrasts in American and Soviet Strategic Thought," 143.

security interests. For him, the destruction that nuclear weapons would cause if they were to be used would far outweigh any political goal. As Robert McNamara concluded, "Gorbachev and the other Soviets have put forth the proposition that the greatest security threat to the Soviet Union—and to the world as a whole—comes not from the United States, but from the existence of nuclear weapons themselves."[46]

## C. SPECIFIC NUCLEAR DOCTRINAL CONSEQUENCES

How have the previously discussed components of strategic culture shaped Soviet (and now Russian) nuclear doctrine? Three themes are germane. The first theme concerns the struggle between pre-emptive attack, "no-first-use," and the "use-or-lose" mentality. This theme helps characterize whether the Russians are more likely to use their nuclear forces in a first strike, a retaliatory attack, or not at all. Current Russian nuclear developments would indicate that Russia does not subscribe to the de-alerting proponents' claim that it would launch on warning. On the contrary, the Russian nuclear weapons system is moving more toward a survivable force capable of "riding out" an initial attack and preserving retaliatory capability. The second theme considers the nature of Russian nuclear operations and whether nuclear weapons use would be massive, using large numbers of weapons, or selective, using small numbers of weapons. Declaratory evidence indicates that Russia is willing to consider

[46] Robert S. McNamara, *Out of the Cold: New Thinking for American Foreign and Defense Policy in the 21st Century* (New York: Simon and Schuster, 1989), 110 and 138.

various attack options, and would not automatically retaliate massively against its attacker. Third this section examines the Russian response to missile attack warnings, and determines whether Russia operates under a launch on warning (LOW) or launch under attack (LUA) policy. In actual practice LOW (contrary to the suggestions of the de-alerting proponents) has not been Russia's automatic response to a false or ambiguous missile attack warning.

### 1. Preemption and "Use or Lose"

Fear of invasion from vulnerable borders weighed heavily in Nikita Khrushchev's early commitment to a preemptive attack doctrine. The painful lessons of German invasion in World War II led Khrushchev to denounce Stalin's policies after the latter died. Stalin, Khrushchev claimed, had failed to anticipate the German invasion and to prepare the state sufficiently for defense. This surprise would never happen again.[47] Soviet military leaders promoted the strategy of the nuclear offensive, and with it the advantages of surprise and attacking first, or "preempting" any potential enemy effort before it threatened the Soviet Union. By attacking first and disrupting an enemy's command and control structures, the Soviet Union could enjoy the highest likelihood of limiting damage, surviving the war, and keeping its forces intact.[48]

The Soviet decision for a preemption policy was partly based on the fact that the Soviet Union's nuclear capabilities were numerically inferior to those of

[47] Bruce G. Blair and Kurt Gottfried, eds., *Crisis Stability and Nuclear War* (New York: Oxford UP, 1988), 127.
[48] Ermarth, "Contrasts in American and Soviet Strategic Thought," 152.

the United States until 1970, when the USSR achieved parity. Until that time, Soviet leaders assessed that their nuclear forces were vulnerable to disabling attack by the United States. Vulnerable nuclear forces could not be used for retaliation. Thus the Soviet Union feared the United States. Tensions between the two countries were high as the United States, through its actions and words, made it clear that it opposed the Soviet ideology and aimed to keep the USSR's expansionist tendencies in check, possibly through the threat of nuclear weapons.

Preemption, however, requires forces at relatively high states of alert, or readiness for launch. Most of the Soviet forces were not in a high alert state in the 1950s and 1960s. Any move to bring the Soviet forces to launch readiness would have probably been detected by U.S. intelligence sources, and might have invited a preemptive attack from the United States.

ICBMs and SSBNs changed the calculus when they were introduced, reducing the perceived need to preempt. ICBMs had two advantages. First, they could be housed in hardened silos, improving their chances of riding out an attack and still retaining a retaliatory capability. Second, alert preparations could be accomplished in relative secrecy, out of sight of U.S. intelligence assets such as the U-2 spy plane in the early part of the Cold War, and later satellites. The Soviets also hardened their command and control facilities and chose to move many to underground sites. This improved the survivability of both the systems and the people running them. Silo-hardening and buried command facilities thus

lessened the need to attack preemptively, as long as one believed that the silos and command bunkers were survivable.

Changes in U.S. capabilities from lower to higher yield counterforce warheads and more accurate missile guidance systems in the 1980s reversed the stakes by threatening these facilities. The Soviets could maintain high levels of alert and a capability to attack preemptively when needed, but their forces might not survive a U.S. first strike. The United States had similar fears of Soviet capabilities, and began developing systems that would be more difficult to attack, such as the rail-based MX missile system. This assessed threat to survivability leads to the de-alerting proponents' claim that current Russian leaders have a "use or lose the capability to retaliate" mentality that shapes their nuclear doctrine. How valid is this "use or lose" claim? Are current Russian nuclear forces as vulnerable as the de-alerting proponents claim? Some Russian nuclear system developments actually point to an increase in Russian nuclear forces' survivability.

Russian ballistic missile submarines contain a significant retaliatory capability. However, because of low or non-existent operating and maintenance funds, these submarines have rarely gone to sea since the end of the Cold War. Moored in their homeports, these submarines are vulnerable to an incoming strike but could conceivably launch their missiles before being hit.

Two other Russian developments would seem to argue against the proposition that the Russians have a "use or lose" mentality. The first is major

survivability improvements in nuclear facilities, which could include nuclear command and control functions. Kathleen Bailey testified in March 1998 about the survivability merits of the Russian facilities at Yamantau and Kosvinskiy Mountains.[49] The facilities would appear to be impermeable to a missile attack, even by the highly potent U.S. Trident II or MX/Peacekeeper warheads. Thus the Russian fear of losing precious command and control facilities to a U.S. first strike would seem to be greatly diminished. Continuing construction efforts at these sites would appear to underscore Russian confidence in their survivability during any attack.

The second enhancement to the Russian nuclear arsenal is continued developments in mobile missile launchers. The most recent is the SS-X-27 (Topol-M), which Kathleen Bailey has described as a "highly accurate and reliable mobile ICBM."[50] Mobile missiles are extremely difficult to target when deployed out of garrison (storage areas). It is very difficult for overhead satellites (and the analysts) to find deployed mobile missiles in the first place. It is equally difficult to convey launch coordinates to attacking platforms in a timely manner. Hitting the mobile missiles before they re-deploy to another location would be challenging. Submarines at sea have inherent communications delays, making the timely transfer of target coordinates difficult. Manned bombers have long transit times to their weapon launch positions. ICBMs would seem to be the most

[49] Kathleen C. Bailey, "Key Considerations for Shaping the U.S. Nuclear Deterrent in the Post-Cold War World," *Testimony Before the U.S. Senate Armed Services Committee, Subcommittee on Strategic Forces* (Washington DC, Federal Document Clearing House, Inc., 31 March 1998).
[50] Bailey, "Key Considerations for Shaping the U.S. Nuclear Deterrent," 60.

likely candidate for targeting mobile missiles, yet using them to attack mobile missiles might detract from their function of holding other targets at risk. If U.S. ICBMs were used against mobile Russian missiles, the Russians would probably have enough warning time to move their mobile missiles before the U.S. ICBMs could reach their targets. Thus the mobile missiles remain highly survivable.

These improvements in underground facilities and the survivability of mobile missiles raise doubts about the de-alerting proponents' claim of a Russian "use or lose the ability to retaliate" mentality. If Russian leaders believe that they have at least some survivable nuclear forces and associated command and control facilities, they will be less likely to order a launch in response to a false or ambiguous missile attack warning. Thus these Russian capability changes should help to improve the stability of the U.S.-Russian nuclear balance and make accidental nuclear war less likely.

How should one assess the claim that the Russians believe that the United States would attack first? While there are certainly Russian cultural fears of external aggression and Russian acknowledgements of U.S. nuclear capabilities, this study found no evidence that Russians consider the United States a primary aggressor likely to launch a first strike. There is instead much more apparent concern over regional conflict and the possibility of Russia using tactical nuclear weapons first:

> By virtue of ... Russia's geostrategic position, tactical nuclear weapons are of far greater military and political significance for it than for the United States.... Tactical nuclear weapons, while also

preserving a deterrent role, may accomplish the mission of repelling aggression here....[51]

There is certainly not in the foreseeable U.S. future any advantage to striking first at Russia. In fact Bruce Blair in 1988 described the major rationale arguing against a U.S. first strike. He concluded that:

- Strategic warning of an imminent nuclear attack could be mistaken, and preemption would therefore foreclose any opportunity to avoid the disaster of nuclear war.
- Nuclear retaliation by the Soviet Union would have been inevitable if the United States had preemptively attacked.
- Soviet retaliation would have probably been unrestrained once a massive U.S. preemptive attack was detected.[52]

In the current state of U.S.-Russian relations, the claim that Russian leaders truly believe that the United States would attack first with nuclear weapons would seem to be less credible than at first glance. The possibility of mutual assured destruction still exists. Is there any credible reason for one country to start a war which neither side would truly "win?"

Russia's early warning personnel and NCA are more likely to question the validity of an unexpected or ambiguous missile attack alert than to respond with an immediate launch. Rather than resort to an immediate LOW nuclear missile launch against the United States, Russian leaders might seek other sources of

[51] Major General (retired) Vladimir S. Belous, "Means of Political and Military Deterrence: Evolution of Washington's Views on Tactical Nuclear Weapons," *Nezavisimaya Gazeta*, 31 October 1996, trans. FBIS Document ID: FTS19961031000773.

confirming information outside of the early warning system. These sources might include shared early warning data, as discussed below, as well as their own strategic warning sources within the Russian intelligence community.

### 2. Limited Nuclear Options vs. Massive Attack

De-alerting proponents claim a high likelihood of a massive Russian nuclear response to a missile attack warning. According to some indicators, this action would be consistent with previous Soviet policy, but it might not be the case today, as recent Russian rhetoric and force posture improvements suggest.

By the 1970s, both countries had considered strategies other than massive retaliation and mutual assured destruction. The United States had considered massive retaliation plans as early as 1953. In the 1960s, Robert S. McNamara explored the possibility of using nuclear weapons only to target military facilities. His 1962 "Ann Arbor" speech opened the U.S. public debate on not targeting cities.

Nuclear strategists have spent considerable time considering ways of limiting damage in a nuclear war. For example, Jack Snyder identified the divergence in American and Soviet nuclear employment strategies. The United States adopted a cooperative, bilateral flexible options outlook (limited nuclear options) and the Soviet Union preferred damage limitation.[53] The prevailing U.S. doctrine in the 1960s, 1970s, 1980s, and 1990s has accepted the notion that nuclear wars need not involve massive strikes. Rather, nuclear war could

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[52] Blair, *Crisis Stability and Nuclear War*, 84.

possibly be limited to a smaller set of flexible options. For American planners, elements of strategic flexibility such as smaller strikes against military targets could conceivably diminish the chances of uncontrolled escalation. The limited nuclear options strategy would use a small number of weapons against selected targets, holding weapons in reserve. These reserve forces would serve as a deterrent against further attacks, keeping the enemy force at bay by holding it and other targets at continued risk. In theory, Russian forces held back from attacking U.S. forces would then be prevented from escalating a conflict. U.S. nuclear doctrine has held that the United States would always have the means of assured destruction—that is, to retain the capability to "inflict at all times and under all foreseeable conditions an unacceptable degree of damage upon any single aggressor—even after absorbing a surprise attack."[54]

Soviet doctrine was different. In 1978 Ermarth pointed out that "Soviet propagandists denounced limited nuclear war concepts as U.S. contrivances to make nuclear weapons use more 'acceptable' and to rationalize the quest for counterforce advantages. They have replayed the criticism that such concepts weaken deterrence and cannot prevent nuclear war from becoming unlimited."[55]

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[53] Snyder, "The Soviet Strategic Culture," 38.
[54] Twining, "The New Nuclear Equation," 114.
[55] Ermarth, "Contrasts in American and Soviet Strategic Thought," 148.

Thus, the Soviet "damage limitation" would be undertaken through unilateral action. The Soviets would limit damage to Soviet forces and territory by unrestrained counterforce strikes intended to disable an enemy before it could engage Soviet forces.[56] The fact that the Soviets relied on these strikes was a natural outcome of their politico-military culture. Snyder points out that much of Soviet strategy came from the cadre of professional military officers with heavy influence in the Soviet political circles. Military officers wage their battles in terms of what it takes to win. From the Strategic Rocket Forces' inception in 1959, Soviet military writings were clear that "the basic, determining method of waging war is not the attack of the Ground Forces...but the delivery of mass nuclear rocket strikes...."[57]

In the post-Cold War era there have been signs that Russian nuclear employment doctrine may have changed to match U.S. doctrine more closely. The absolute duty of the Russian military remains clear. As Gray observed,

> If the [Soviet] politicians fail to prevent war, the Soviet military establishment would do its duty and endeavor to conduct it in efficient pursuit of a clear, favorable military outcome. The consistency of evidence (from writings, from behavior in other military-diplomatic respects, from the technical details of Soviet military deployment, from exercises, and from Soviet/Russian strategic-political culture) is remarkable and probably should be viewed as persuasive—if only for reasons of prudence.[58]

A nuclear attack on Russia would be seen as a breakdown in the diplomatic-political process. It would be the Russian military's duty to protect the

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[56] Snyder, "The Soviet Strategic Culture," 38.
[57] Twining, "The New Nuclear Equation," 204.
[58] Gray, *Nuclear Strategy and National Style*, 71.

sovereignty of the state and the survival of its leadership by using the striking force it deemed necessary to ensure victory. In current circumstances, Russian nuclear retaliation, if ordered, might take a different form from the massive LOW retaliation predicted by the de-alerting proponents. Achieving a clear military outcome might require only one or several nuclear weapons. Contemporary Russian statements support the option of limited strikes:

> The main forms and methods of inflicting damage on an aggressor remain the delivery ... of single, multiple, or massed nuclear missile strikes in a retaliatory counterstrike....[59]

> Strategic systems must ensure inflicting "surgical" strikes across a wide spectrum of axes and ranges, at very short notice and with minimal ecological consequences.[60]

De-alerting proponents also claim that a massive U.S. response to Russian nuclear strikes would sustain a nuclear war. The U.S. response to a Russian nuclear strike might not be massive, however. The United States appears to maintain its strategy of limited nuclear options using small numbers of forces. This is consistent with Robert Bathurst's assessment in 1981 of U.S. and Soviet strategies:

> [U.S.] language is that of punitive measures such as blockades, economic sanctions, escalating bombing, strategies meant to stabilize but not to transform the world order. They are, moreover, strategies which de-emphasize the role of manpower and increase the role of technology. Whereas on every level, Soviet society is organized for struggle with a clearly defined victory, whether in the

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[59] Colonel Geneneral Igor Sergeyev, Commander in Chief of the Strategic Rocket Forces, "Russia's Nuclear Shield," *Armeyskiy Sbornik*, 1 December 1995, trans. FBIS Document ID: FTS19951201000628.

[60] Colonel Yuriy V. Zuyev and Gennadiy A. Kuznetsov, "Deterring a Possible Aggressor: Necessary Structural Changes to the Strategic Forces Will Enhance the Country's Defense Capability, "*Nezavisimoye Voyennoye Obozreniye*, 29 March 1997, trans. FBIS Document ID FTS19970409001315.

five-year plan or on the battlefield, the USA seems to have given up the idea of victory in war as in diplomacy.[61]

In spite of continued U.S. emphasis on limited nuclear options, it appears that Russian military planners do not believe that U.S. action would be "limited" and always consider the worst case conditions. The Russians thus expect an attack from the United States to be massive, employing large numbers of nuclear weapons. This expectation is discussed below.

### 3. Launch On Warning vs. Launch Under Attack

Would the Russians really launch their missiles on warning (LOW) or wait for confirming information, such as actual weapon detonations on Russian soil, before retaliating, launching under attack (LUA)? Launching on warning and under severe time constraints may have been regarded as a sensible concept when Soviet nuclear forces were concentrated in vulnerable fixed-site ICBMs. Soviet military planners always have been concerned with the time involved with assessing a warning, making a decision to retaliate, and providing orders to the troops in time to ensure successful launches. Soviet diplomats alluded to a LOW strategy as early as 1970 during the SALT I talks, referring to the possibility that given the continuous improvement of early-warning systems, Soviet ICBM silos might be empty by the arrival of an enemy strike. The American delegation, however, provided an official U.S. disavowal (from the Secretary of Defense) of the concept of launch-on-warning. The delegation further criticized the idea as

[61] Bathurst, "Two Languages of War," 32.

dangerous, because it implied automatic escalation or even a war by accident. The Soviet side refused to make a similar declaration.[62]

The previous section on preemption and the "use or lose" mentality concluded that conditions have changed. Hardened underground facilities, ballistic missile submarines, and mobile ICBMs all increase the survivability of Russia's retaliatory capability exclusive of fixed-site silos. In fact, as Kathleen Bailey reminded the U.S. Senate in March 1998, the Russians are still working on improved sea-launched ballistic missiles (SLBMs) and the next generation ballistic missile submarine (SSBN). Additionally, she cited statements made in 1997 by Major General Vladimir Dvorkin of the Russian Strategic Rocket Forces, including his declaration that "Russia does not rely principally on launch on warning but rather on the survivability of its mobile forces."[63] All of these improvements in the Russian nuclear arsenal should reduce the reliance on a LOW doctrine and the critical time imperatives that early warning and decision-making personnel would have to face. The specter of "use or lose" is continually shrinking.

The most probable Russian response during an unexpected or ambiguous missile attack warning would therefore not be a time-critical LOW but a more deliberate consideration of other factors besides the early warning system's indications. These might include strategic indicators, which should be available

[62] Blair, Crisis Stability and Nuclear War, 131.
[63] Major General Vladimir Dvorkin, in an address at the Naval Postgraduate School, 6 November 1997, cited in Bailey, "Key Considerations for Shaping the U.S. Nuclear Deterrent," 67.

well in advance of the early warning system alert. Russian intelligence analysts and leaders would certainly see obvious military movements, diplomatic posturing and rhetoric. Evaluating the preponderance of the indications, rather than reliance upon a single early warning system signal, would seem to be the most likely Russian course of action.

## D. OBSERVATIONS OF NUCLEAR FORCES BEHAVIOR

How have Soviet and Russian nuclear personnel and decision-makers actually behaved when presented with unexpected or ambiguous missile attack warnings? They have not launched their ready missiles "on warning." The decision-makers have not even gone as far as to order any higher readiness for launch. This section examines specific events in the last two decades. It also considers the process of reducing the level of mistrust as discussed by Larson, and examines ways in which the United States and Russia have cooperated since the breakup of the Soviet Union in 1991.

### 1. Strategic Alarms

Little is known about Soviet (and now Russian) missile attack warning events, but two have occurred in recent times. The first was in 1983 and involved a satellite sensor warning. The second was the launch of a U.S.-designed Norwegian rocket in 1995.

In a story recently published in the *Washington Post*, David Hoffman recounts a 1983 event in which the Soviet early warning system sounded an

alarm on the basis of an erroneous signal from a launch detection satellite.[64] The signal was not immediately classified as actual or false but evaluated over several minutes. It showed a total of five ICBMs launched from the United States. Under conditions such as a detection of a single missile the early warning center duty officer would normally first evaluate the alarm before informing the General Staff. In this case, even though the satellite warning was still being evaluated, the number of missile detections caused the early warning system to notify automatically the General Staff of a missile attack (the Soviet "nuclear briefcase" system, KROKUS, was still being developed at that time).[65]

The duty officer decided that the attack signal was in fact false. He advised the General Staff of that fact, and the alert was canceled. The duty officer listed two reasons for his conclusion. The first was the information that the attack consisted of five missiles. This was inconsistent with his training that a U.S. nuclear missile attack would be massive and overwhelming. Second, the duty officer was able to compare his data with that from other radar installations looking in the same sectors as the satellite. In this case the radar sites showed no evidence of missile attack.

It is clear from this account that the Soviets in 1983 did not launch on warning but placed some reliance upon a "man-in-the-loop" to verify and

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[64] David Hoffman, "'I Had a Funny Feeling In My Gut': Soviet Officer Faced Nuclear Armageddon," *The Washington Post*, 10 February 1999: A19.

[65] This is the Soviet/Russian equivalent to the American system for providing key decision-makers with time-critical information and communications circuits relating to nuclear command and control.

integrate the warning information from several different sources in the early warning system. One also might conclude that Soviet beliefs about the probability of a massive nuclear U.S. first strike served as a mitigating factor, preventing a nuclear retaliation in response to this false warning of a limited, "bolt-out-of-the-blue" attack.

The other event frequently cited by de-alerting proponents as "evidence" that the United States and Russia are close to an accidental nuclear war is the January 1995 Norwegian scientific rocket launch. The rocket was designed in the United States and named the Black Brant VII. Its purpose was to lift a payload of instruments into the aurora borealis (northern lights) for scientific study. This launch was not the first of its kind. Norway had fired over 600 scientific rockets since 1962, and had followed fairly standard notification procedures in every case. The difference in this case was the type of boost vehicle. Black Brant VII employed a multi-stage rocket booster that the Russian early warning system personnel characterized as a possible U.S. Trident II SLBM.

Two factors combined to cause a higher level of nuclear angst than had been experienced with earlier scientific rockets. The first was an apparent failure within the Russian government to pass two formal written warnings from the Norwegian government to the Russian Ministry of Defense, which would have notified the early warning personnel of the impending launch. The second was what de-alerting proponents would claim is the typical expectation of Russian General Staff and early warning crews concerning a U.S. attack. That

expectation holds, according to the de-alerting proponents, that if the United States were to launch a first strike, the missiles would come from submarines first. This was likely a worst-case scenario, most likely used to keep Russian early warning center personnel vigilant. SLBMs from the Norwegian Sea would have relatively short flight distances to reach targets within Russia. Thus the timeline for decision-making would be shortened when compared to warning times associated with ICBMs or bomber aircraft or SLBMs fired from more distant launch points.

The first factor highlights a problem not with the national command authorities but with a government bureaucracy that should have forwarded the written warnings to the Missile Attack Warning System (MAWS) personnel on duty during the launch. This information would have been used as a cue for the watch teams in the hope that once their early warning radars detected the missile, they would correlate their real-time data with the advance written warning and have some confidence about the nature of their detection. In this case the MAWS teams would likely not send a warning to the NCA of a possible missile attack. They would still track the missile to confirm that its flight path and probable impact point remained clear of Russia. Nothing has appeared in the open source accounts of the event that would indicate that the Russian authorities have investigated and corrected the problem with written notifications. Therefore it is possible that a similar mistake could be made, again forcing the

system into a state of crisis with the possibility of an incorrect analysis or decision made under the duress of limited time.

The assumption attributed to the Russians regarding a U.S. first strike using submarine-launched missiles is potentially flawed. It assumes that the United States would attack Russia first, rather than in retaliation for a Russian attack. If one examines U.S. behavior and declaratory statements during and after the Cold War, there is no evidence pointing to preparations or plans for a U.S. first strike. There were in 1995 no events that would point to a crisis in U.S.-Russian affairs that would provoke a U.S. first strike.

One also must consider the purpose of the U.S. SLBM forces. The United States depends upon its submarines as a survivable, retaliatory force. U.S. behavior and declaratory statements thus do not point to a high likelihood of the United States using SLBMs for first strike purposes. Russian teachings that the United States will launch a first strike from its submarines may therefore represent not what Russian military planners think, but instead might be an attempt to instill within the military a measure of fear and suspicion of the "enemy."

The concept of a first strike evokes the expectation of a debilitating, overwhelming surprise attack that to the Russians means probable loss of major command and control facilities as well as a majority of their silo-based missiles. The Russian early warning system radar picture in this case did not show a massive attack. It instead showed one multi-stage rocket that was heading not

for Russia but the Northern Sea. This was not the devastating first strike so often drilled into the military watchstanders' minds.

Russian early warning teams activated the communications links to the General Staff. The General Staff in turn sent the warning and activation signals to the NCA briefcases. Thus the President, Defense Minister, and Chief of the General Staff each had the same information available to the early warning centers. Additionally, the three decision-makers had a telephone conference call circuit that backed up the information available on their locally available briefcase (KROKUS) displays. There has been no published record of the specific exchanges between the men during the first anxious and probably confusing minutes following the system activation. However, it quickly became apparent after the first few minutes that the rocket's flight path would pass well clear of Russia. None of the decision-makers initiated a nuclear missile launch based upon this "attack warning."

The Norwegian rocket event revealed bureaucratic weaknesses in the Russian missile launch notification process that need to be fixed. The event also showed that in spite of the claims of a degrading Russian nuclear command and control system, the early warning functions properly detected and tracked the missile over time, giving decision-makers the information they needed to decide if a nuclear retaliation was warranted. In this case, it was not. The most solid conclusion to be drawn from this event is that the Russians do not have a "hair-

trigger" launch on warning posture and that they will take the time to assess all data before taking action.

Observable behaviors in the case of false or ambiguous missile attack warnings helps to assess (1) the nature of Russian nuclear doctrine, and (2) the level of mistrust this doctrine instills in the decision-makers. These examples illustrate that there is probably still an atmosphere of mistrust toward the United States among Russian military and civilian decision-makers. The examples also demonstrate that the early warning systems do work but that false or ambiguous missile attack warnings can occur for administrative as well as technical reasons. This mistrust and false signals do not combine, however, to cause an automatic launch on warning of Russian missiles toward the United States. Rather, Russian decision-makers have cautiously acted on a preponderance of the information, used backup systems to confirm initial indications, and compared indications with expectations. The result has been no Russian missile launches on false or ambiguous missile attack warning signals.

### 2. Confidence Building Measures

Even though none of these past events has resulted in a nuclear launch, the United States and Russia do acknowledge that failures could occur. Both of these countries have taken initiatives to reduce the risk of a combination of early warning system failures and human biases culminating in a nuclear exchange. These initiatives have reduced mistrust on the part of decision-makers and improved early warning system reliability. A series of actions has had incremental

effects and has collectively served to make for a safer system without the destabilizing effects of de-alerting.

For example, the Cooperative Threat Reduction (CTR) program was created in 1991 through legislation proposed by U.S. Senators Sam Nunn and Richard Lugar. Under CTR, U.S. financial backing, technical expertise and qualified personnel combine with Russian efforts to inventory, store, and control Russian nuclear warheads. This program helps protect Russian nuclear materials from falling into the wrong hands and threatening Russia, the United States, or other countries. It probably has other indirect, yet positive, effects. The concept of working together to prevent a perceived common enemy from obtaining a threatening nuclear capability through black market fissile material sales probably helps to build trust between former Cold War opponents.

The United States and Russia embarked on a military-to-military exchange program in 1993. The program became a main conduit for Russian military dialogue with the West (and vice versa) by making possible personal contacts between military leaders. Both American and Russian officers have welcomed the program, exchanged information on baseline capabilities and doctrine, and planned joint military exercises.[66] As of 1997, over 500 contacts had taken place.

General Eugene Habiger, USAF, then Commander of the U.S. Strategic Command, traveled to Russia in October 1997 and reported to the U.S. Congress on his findings. He testified in March 1998 that "the equitable method

[66] Todd Perry, "Nunn-Lugar's Unfinished Agenda," *Arms Control Today*, 27.7 (1997): 14-22.

used to reduce the numbers of nuclear weapons, as well as military to military exchanges, has strengthened our relationship with Russia over the past few years." Habiger noted that he was the first non-Russian ever to tour certain Russian nuclear facilities, and that he was impressed by their operations from the national level to the unit level and was "greatly assured about the Russian safety and security practices of their nuclear weapons."[67] The military-to-military exchange program has had very positive results. Its future, however, is in doubt as Russia suspended its participation following the U.S. decisions to support NATO expansion as well as NATO's military intervention in Kosovo in March-June 1999.

The United States and Russia also have taken steps to offset degradations in Russian early warning capabilities. In September 1998, President Yeltsin and President Clinton announced in what has become known as the "Moscow Declaration of 2 September 1998" their intention to exchange information continuously on ballistic missile and space vehicle launches derived from each country's early warning system.[68] This shared early warning data arrangement will probably take one or two years to develop but shows promise in reducing the chances of false or ambiguous missile attack warnings. Shared,

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[67] Testimony before Strategic Forces Subcommittee of the U.S. Senate Armed Services Committee on 31 March 1998.

[68] Michael R. Gordon, "U.S. to Use Its Missile Warning System to Alert Russians to Launchings Worldwide," *New York Times*, 2 September 1998: A9; USIA [spell out] , "Text: Clinton/Yeltsin on Exchange of Info on Missile Launches," *Joint Statement on the Exchange of Information on Missile Launches and Early Warning* (USIA, 2 September 1998), Available Online: http://www.ceip.org/programs/npp/us-russia%20missile.htm

real-time early warning system information may provide sufficient capability for filling the gaps in the Russian early warning system and could either corroborate or rule out the existence of an attack on Russia. The program would establish a joint missile warning center, probably located in or near Moscow and staffed by both American and Russian military officers. Shared early warning data from the United States would go to both the Russian General Staff as well as to this joint missile warning center as an independent evaluation and would in theory help to fill gaps in the current Russian system.[69]

### 3. Deteriorating Conditions in the Russian Military

None of the above programs directly affects the well being of members of the Russian military. There has been in recent years a decline in the Russian military's cohesiveness and sense of mission. Russian military officers might in some domestic crises be unwilling to follow orders and take action against their peers in certain regions. This might place the security of nuclear weapons in some regions at risk from loss of protection and control.[70] In the case of an outside attack, however, the Russian military remains committed to protecting the homeland.

The Russian military's subordination to civilian control over time may become questionable. Multiple factors could adversely affect Russian military

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[69] Michael R. Gordon, "U.S. Urges Russia to Help Avoid False Nuclear Alerts," *New York Times*, 22 February 1999: Available Online: http://www.nytimes.com/library/world/europe/022299us-russia-missile.html

[70] Deborah Yarsike Ball, "The Unreliability of the Russian Officer Corps: Reluctant Domestic Warriors," in *Director's Series on Proliferation*, ed. Kathleen C. Bailey (Livermore, CA: Lawrence Livermore National Laboratory, 17 November 1995), 29.

performance and attitudes. Among these are the Russian government's continuing arrears in paying its troops and severe cutbacks in operations, which affect combat readiness. As an example, promissory notes issued by the Russian government in 1998 to cover housing costs became worthless as the value of the ruble plunged in August 1998.[71] It is unknown how severe the effects will be, but with Russian military personnel experiencing higher crime and suicide rates as well as corruption, the situation is bound to get worse before it gets better.

### 4. Continuing Russian Mistrust toward the United States

Certain actions outside the nuclear realm on the part of the United States have not been well received by the Russian government and have tended to reinforce the existing feelings of mistrust about U.S. intentions. U.S. military action against Iraq in December 1998 met with Russian disapproval, because Iraq has historically been a Russian partner. U.S. support for NATO expansion has evoked similar reactions from the Russian government, as noted earlier.

Likewise, Russian acceptance and trust of Western ideas may be tempered by recent failures in the country's attempt to adopt capitalism as a replacement for the old socialistic system. It seems that the Russian psyche remains reserved in this respect, preferring instead to revert back to old systems.

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[71] Walter Pincus, "Russian Military Decay Detailed," *The Washington Post*, 21 February 1999: A24.

Russians might prefer to turn inward to solve national problems rather than being subject to Western influence.

## E. CONCLUSION

Evidence drawn from Russian strategic culture has not validated the de-alerting proponents' claims. When presented with a false or ambiguous missile attack warning, the Russians would probably not launch their nuclear missiles against the United States based on the warning itself. Russian NCA decision-makers would respond based upon a preponderance of information tempered by their beliefs about U.S. intentions and methods. Russian NCA beliefs have been affected by strategic culture, to the point of adopting doctrines and policies emphasizing beliefs in a massive U.S. first strike that would be countered by a massive Russian retaliation. This action has not materialized in practice. Mistrust exists, but perhaps little more so than between other competing nations. There is certainly not a high enough level of mistrust to cause an automatic retaliatory action on the part of Russian decision-makers following a false or ambiguous warning relayed by technical sensor systems.

Pressure on Russians to "use or lose the ability to retaliate" is not really reflected in Russian thought today. Invulnerable underground command facilities and continuing improvements in the mobile ICBM arsenal suggests that Russians rely increasingly on survivable forces. These forces give the Russians a strong incentive to be cautious and prudent in the face of a missile attack warning, knowing that Moscow has an assured retaliation capability.

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## IV. EARLY WARNING SYSTEM PERFORMANCE AND THE SO-CALLED "HAIR-TRIGGER" EFFECT

This chapter explores the de-alerting proponents' claim that both the American and Russian nuclear weapon systems are on a "hair-trigger" alert. The term "hair-trigger," however, is not clearly defined. The de-alerting proponents claim that the combination of the "hair-trigger" and early warning system degradation might prompt Russian decision-makers to order a nuclear launch on warning, following an ambiguous signal of attack. This chapter examines both the Russian and American nuclear weapons system structures for evidence of a "hair-trigger." It first provides a definition of the "hair-trigger" concept and then examines the condition of the Russian and American early warning (EW) and command and control ($C^2$) systems. The previous chapter demonstrated that Russian decision-makers are not likely to act in a precipitous manner toward false or ambiguous early warning system signals. This chapter examines instances in which the U.S. system faced missile attack indications.

The evidence suggests that the "hair-trigger" term coined by de-alerting proponents is not an accurate description of how the Russian and U.S. nuclear weapons systems respond to attack warnings. The "hair-trigger" analogue of a gun that is cocked and shoots at the slightest disturbance is an inappropriate characterization of U.S. and Russian alert states. There is a difference between a force that is ready to launch on a moment's notice and an NCA's willingness to launch based upon a preponderance of the information presented to it.

## A. DEFINING "HAIR-TRIGGER" ALERT

A nuclear weapons system's alert status represents its readiness to put its strategic bomber aircraft in the air or launch its missiles when ordered by National Command Authorities. The United States and Russia maintain that their ICBM and SLBM systems are on a high alert state, ready to launch within minutes of an order. De-alerting proponents hold that because decision-makers realize they have nuclear missiles at their immediate disposal, it would be easy to decide to launch them on warning. De-alerting advocates also have expressed concern that even if political decision-makers do not make a decision to launch, senior military commanders may order a launch instead. Thus, the de-alerting proponents conclude, the two countries' nuclear weapons systems are too sensitive to external disturbances, such as false or ambiguous warnings. The chance of a missile launch, they conclude, is so high that they characterize the U.S. and Russian systems as being on "hair-trigger" alert.

## B. ELEMENTS OF A NUCLEAR SYSTEM AFFECTING ALERT STATE

There are several elements that determine the specific level of alert maintained by each country. U.S. and Russian systems have many common characteristics. These characteristics take the form of (1) positive and negative controls, (2) civilian control over the military, (3) a high degree of coupling, and (4) reliability and redundancy features. For the United States and Russia to maintain their nuclear arsenals on high alert, there must be strong confidence in the types and strengths of the controls placed on the systems. This section

discusses the controls and explains how the American and Russian systems use them today.

### 1. Positive and Negative Controls

Positive controls in system and procedural design help to ensure that nuclear weapons launch when ordered. Negative controls in system and procedural design guard against unauthorized, accidental or inadvertent weapon system use due to mechanical failure, electrical failure, human error, or irrational behavior. Thus, positive controls help ensure weapon usability while negative controls contribute to weapon system safety.[72] Since de-alerting proponents are attempting to prevent nuclear weapons launches, this discussion will be limited to negative controls. This section provides examples from the U.S. nuclear weapons system. It includes some references to Russian systems.

The first negative control is a "primary use-control device," or a coded lock system. In the United States it is called a permissive action link (PAL). The Russian system is similar in function. It may inhibit detonation or prevent unauthorized launch of a nuclear weapon.[73] PAL codes do not reside at the individual weapons launch command level, but are provided from higher authority when the NCA has authorized using nuclear weapons.[74]

The second types of negative controls are personnel security measures. They include the two-man rule and the Personnel Reliability Program (PRP). The

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[72] Feaver, *Guarding the Guardians*, 12.
[73] Feaver, *Guarding the Guardians*, 205-208.
[74] Bruce Blair, *The Logic of Accidental Nuclear War*, (Washington DC: Brookings Institution, 1993) 279.

two-man rule requires all nuclear operations such as assembly, movement, and maintenance, to be conducted with two people present at all times. One person can observe the actions of the other and detect if unauthorized procedures have occurred. If either person detects unauthorized procedures, he stops the operation. The PRP carefully monitors the physical, emotional, psychological, and financial health of all military personnel involved with nuclear weapons. It is designed to detect any evidence or appearance of irregularities that would lead a person to initiate an unauthorized use.[75] The Russian military has witnessed the PRP system in action through the military-to-military exchange program and has equivalent security measures.

### 2. Degree of Coupling

Coupling describes how closely the different parts of a nuclear system are linked. It is a factor in the system's time-responsiveness. A "tightly coupled" system is necessary where there are time limits on action. Things have to happen quickly within a specified time to avoid penalties, such as losing missiles to an enemy first strike. In contrast, a loosely coupled system has few time limits. Decisions and action proceed more slowly or can be put on hold. Both the U.S. and Russian systems are individually tightly coupled. Additionally, because of the extensive capabilities of sensors, the U.S. and Russian systems are tightly coupled with each other. Information from sensors reaches launch sites quickly, and each system reacts quickly to warning system alerts. According to Sagan,

[75] Feaver, *Guarding the Guardians*, 16-17.

this could have unfortunate effects, producing escalation and accidents.[76] In reality, however, tight coupling between the two countries' systems has to date not resulted in a fatal accident. Although both have had occurrences of incoming missile alerts, neither side has come close to launching its missiles.

What happens when the early warning system sounds an alert of a missile attack? Along with immediate warning messages to the forces, both the U.S. and Russian systems would activate communications links between the military and political centers. This happened both during the U.S. false alerts in 1979 and 1980, as well as the Russian-Norwegian rocket alert in 1995. In the United States, both the North American Air Defense Command (NORAD) and the National Military Command Center (NMCC) share responsibility for validating the warning and advising the President.[77] In Russia, the process is similar. Modern satellite, fiber optic, and sophisticated radio circuits guarantee communications connectivity with sensor stations, which would either confirm or deny the missile launch indications.

### 3. Civilian vs. Military Control

Nuclear weapons must normally be authorized for release by competent authority. Authorization normally flows from the top civilians down to military forces. Nuclear weapon control can be highly centralized at the top of the civilian hierarchy, or it can be more decentralized and reside with the force commanders.

[76] Sagan, *The Limits of Safety*, 34.
[77] Sagan, *The Limits of Safety*, 119.

There are four issues related to civilian control and the decision to use nuclear weapons: (1) physical control of nuclear weapons, (2) the line of presidential succession, (3) devolution of command, and (4) pre-delegation of authority.[78]

Both the United States and Russia place physical control of their nuclear weapons in the hands of the military and have a written line of presidential succession. Devolution of command through succession refers to transferring command authority when the next superior in the hierarchy is killed or is unable to exercise his power. Optimum devolution of command, however, may conflict with presidential succession, however. In crisis situations, some would argue that the best succession of command would be through the military hierarchy instead of a civilian system (e.g., in the United States, succession devolves via cabinet secretaries). Civilians might be less qualified than military commanders in nuclear operations, because they have infrequent involvement in daily nuclear decisions.[79] Whatever the merits of this argument, both the United States and Russia exhibit strong confidence in their civilian political leadership.

Pre-delegation of authority is authorization from a higher to a lower command to employ weapons at a local commander's discretion. Pre-delegation overcomes an inability to obtain nuclear authorization in a crisis where time might be of the essence and waiting for higher authorization in a crisis would result in defeat. The drawback is the possibility that an inappropriate decision by a lower

[78] Feaver, *Guarding the Guardians*, 37.
[79] Feaver, Guarding the Guardians, 44-45.

command to employ a nuclear weapon would go unchecked by higher command.[80] There is no evidence that the United States or Russia pre-delegates strategic nuclear weapon use to individual military commanders.

### 4. Reliability and Redundancy

Reliability in system design helps to ensure that nuclear weapons will launch and detonate. It also means that the EW and $C^2$ systems will function properly nearly all the time. Redundancy in design works in two ways. First, redundancy might be used to ensure multiple signal paths for arming a nuclear weapon, increasing its reliability for detonating. Second, multiple methods may be used for preventing an indication from propagating beyond a certain point, particularly in the case of a early warning system signal. An example of redundant systems would be the backup radar sites and communication links that would help confirm missile detection. Redundancy helps to improve safety and to lessen the chances of a false signal being construed as true.

U.S. and Soviet strategic forces are effectively combined into a single nuclear system. The intelligence and warning networks of each side create tight coupling. For example, a threatening Russian military action, such as deploying forces or placing forces on higher alert, can be detected almost immediately by American systems and conveyed to force commanders.[81] If the Americans then repositioned to counter the Russian move, there is a good chance that the

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[80] Feaver, *Guarding the Guardians*, 49.
[81] Paul J. Bracken, *The Command and Control of Nuclear Forces*, (New Haven: Yale UP, 1983) 60.

American response would be detected by Russian intelligence sources. The actions of one country affect the actions of the other.

Could human error or a mechanical or electronic failure in the command and control system or in a missile cause an inadvertent launch? Failures and false alerts have occurred. Canadian geese have provided convincing, bomber-like radar returns, computer chips have failed and sent false warnings, and missile technicians have improvised procedures that have compromised missile launch interlocks.[82] Today's systems are probably more robust and reliable than those of yesterday. Although their ability to withstand the effects of electromagnetic pulse during a nuclear explosion is untested in many cases, there is little reason for failure before a close detonation. Systems today also are more complex and include redundancy features that guard against accidents. In 1983 Paul Bracken argued that, "the more complex, the more redundant. I believe the likelihood of nuclear war by pure technical accident is much lower today...precisely because of today's more complex warning and control system."[83] It should be noted, however, that Scott Sagan would disagree, arguing that high reliability offers only an appearance of safety. In Sagan's view, higher complexity means a higher chance for error.[84]

Russian and American leaders keep some of their nuclear weapon systems on high alert because they want to maintain the option of responding to

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[82] Sagan, *The Limits of Safety*, 117 and 231.
[83] Bracken, *The Command and Control of Nuclear Forces*, 53.
[84] Sagan's view is based on Normal Accident Theory, as expounded by Charles Perrow, *Normal Accidents: Living with High-risk Technologies* (New York: Basic Books, 1984).

threats or actual attacks. Keeping the nuclear weapons systems on high alert gives decision-makers the option of responding immediately but does not affect their ability to delay action until all relevant information has been considered. These positive and negative controls, tight coupling, civilian control, and reliability and redundancy features give decision-makers confidence that their nuclear weapons will work when needed yet will not be launched in an accidental or unauthorized fashion.

## C. THE RUSSIAN EW/C$^2$ SYSTEM

### 1. Early Warning

Good early warning system performance promotes stability. If a potential attacker knows the target country has a good warning system and can credibly act to protect itself and minimize damage, then the attacker is less likely to launch an attack in the first place.[85] The command and control system would not be able to function without good information from the early warning system. The Russian early warning system suffers from gaps in coverage, yet a significant capability still remains. Additionally, the joint U.S.-Russian effort to share early warning sensor information from both countries' systems is well underway. Russian officers will serve with American officers in a special command post in Colorado Springs, Colorado, in December 1999.[86] Figure 4 depicts the known coverage of the Russian early warning radar systems, superimposed on the

[85] Bracken, *The Command and Control of Nuclear Forces*, 48.
[86] Elizabeth Becker, "Russia to Join U.S. in Battle to Ward Off Y2K Debacle," *The New York Times*, 28 October 1999, A14.

former Soviet Union's territory. Gaps in Russian radar system coverage exist on certain azimuths.

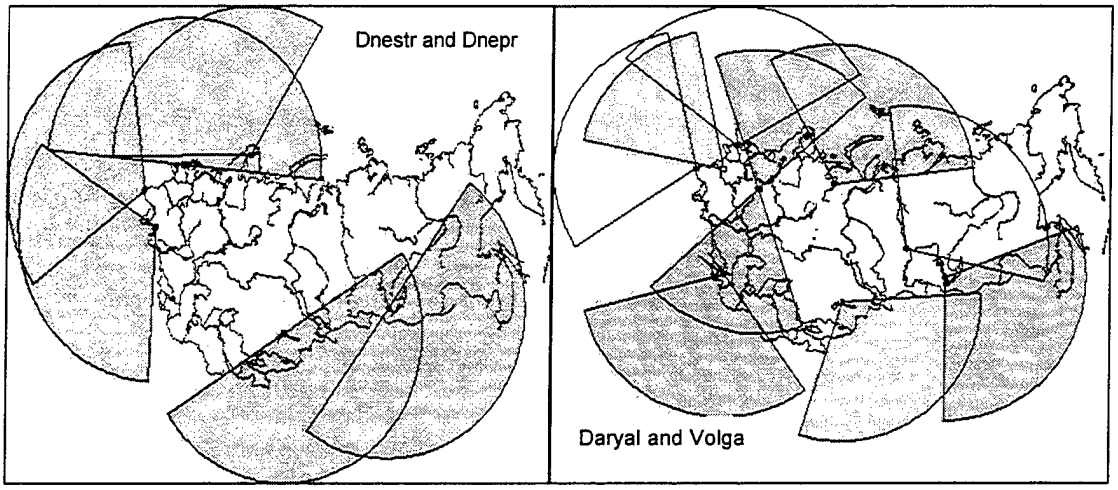


**Figure 4: Russian Early Warning Radar Coverage**[87]

The Russian early warning system consists of two families of ground-based radars and satellites. The Dnestr and Dnepr (known as Hen House-type) radars were built in the 1960s and early 1970s and will reach the end of their operational lives by the late 1990s. By that time the Daryal (Pechora-type) and Volga radars were supposed to replace the Hen House radars and provide detection of a missile attack from practically any direction. The collapse of the Soviet Union interrupted funding and modernization work on the early warning system, and left many radar sites outside of territorial Russia. The Russian government has had problems in negotiating operating agreements with newly independent states that host these radar sites.

[87] Vladimir S. Belous, Anatoli S. Diakov, Timus T. Kadyshev, Yevgeny V. Miasnikov, and Pavel L. Podvig, *Nuclear Arms Reduction: The Process and Problems*, ed. A. S. Diakov (Moscow: Center for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology, 1997), Available Online: http://www.armscontrol.ru/reductions/ch3.htm

Figure 5 shows the current Russian EW satellite coverage. The first satellites of the space-based early-warning system were commissioned in 1982. The original system design called for nine satellites in high elliptical orbits. However, the system works with fewer satellites. Only seven satellites were working in September 1997, with the system still providing continuous coverage of U.S. ground-based ICBM deployment areas. The space-based system also requires several geo-synchronous satellites to watch for SLBM launches. In September 1997 only two geo-synchronous satellites were in working condition, presumably providing coverage of the North Atlantic U.S. SSBN patrol areas.

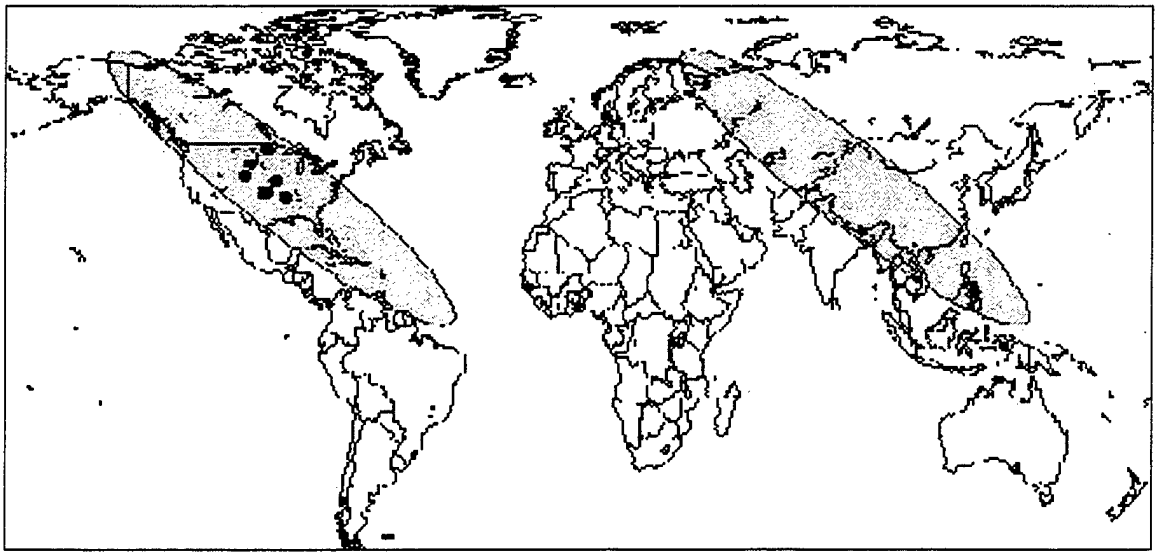

**Figure 5: Russian Early Warning Satellite Coverage**[87]

### 2. Command and Control

In nuclear command and control, the Russian system is highly centralized and contains a number of negative controls (the U.S. system is less

centralized).[88] In spite of highly centralized control, the Soviet chain of nuclear command and behavior were often ambiguous. For instance, in 1982, when Leonid Brezhnev died, it took four days to name his successor. It is not clear who in that interim period held nuclear launch authority, although the Soviets surely had some contingency plan. The faith of the Soviet military personnel in information from their leaders has been questioned, too. In 1984, Soviet fleet headquarters in Vladivostok sent a war alert (in the middle of peacetime operations) to ships at sea. In return, headquarters received many queries of bewilderment from ships.[89]

During the aborted August 1991 coup, the Soviet President's nuclear briefcase was seized and may have been held by the coup plotters. Soviet Strategic Rocket Forces commanders, however, made a collective decision to disregard any launch orders during the coup. They placed the nuclear launch system in a protected manual mode that the coup leaders could not have bypassed to cause a nuclear missile launch.[90]

In the post-Cold War environment, Russian nuclear release authorization remains highly centralized between the President and his Defense Minister, and PAL-like unlocking codes are held at only the highest levels. President Yeltsin

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[88] Blair, *The Logic of Accidental Nuclear War*, 113.
[89] Meyer, "Soviet Nuclear Operations," *Managing Nuclear Operations*, ed. Ashton B. Carter, John D. Steinbrunner, and Charles A. Zraket, (Washington DC: The Brookings Institution, 1987), 470-471.
[90] Blair, *The Logic of Accidental Nuclear War*, 83.

has not created new institutions for civilian control to replace the old Communist Party apparatus.[91]

The Russian command and control system is showing signs of age. It is relatively stable today but its future is uncertain. There is some concern about degradations in the Russian control systems that cause them to shift into their "combat mode" without meeting the conditions for doing so. In May 1997, *The Washington Times* reported instances in which the Russian nuclear control system spuriously switched to a combat mode (a higher state of launch readiness). Russian officials, including Defense Minister Igor Rodionov, admitted that the system is getting old and has not been properly maintained due to lack of funding.[92] Boris Mikhailov, the general director of the Russian scientific research group Impulse, and his chief system designer, Vladimir Petukhov, also acknowledge that the Russian command and control system is in dire need of an overhaul. They endorse the Defense Minister's stance that such an overhaul cannot be done now because of a lack of funds.[93]

Although some observers have expressed concern about this "combat mode," the *Times* article explained that this mode starts up the internal guidance computers and navigation gyroscopes, but would not necessarily result in an unauthorized missile launch. In fact, the article, quoting sources, noted that the CIA considered the chance of an accidental launch as low. In spite of these

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[91] Blair, *Global Zero Alert*, 20.
[92] Bill Gertz, "Mishaps Put Russian Missiles in 'Combat Mode'; Defense Minister Vexed by Breakdowns Due to Short Funds," *The Washington Times*, 12 May 1997: A1.
[93] Bill Powell, "A Looming Disaster," *Newsweek*, 23 June 1997, 50.

recent degradations in Russian EW and $C^2$ systems, the Russians have not overreacted to system alerts. Rather than place their launch systems in the highest state of readiness, they have acted prudently to prevent any crisis between themselves and the United States. Thus, there is no evidence that the Russians have a "hair-trigger" nuclear weapons system.

## D. EXAMINING THE U.S. SYSTEM FOR A "HAIR-TRIGGER" EFFECT

The United States retains an edge over Russia in the quality of its early warning systems. Its collection of early warning satellites and long-distance radars is unequalled. Negative control remains high, both for warhead reserves as well as warheads on missiles and bombs. The United States maintains an active alert status, notably for ICBMs and SLBMs. The U.S. civil-military balance of power favors civilian control and decentralization. The reason, according to Stephen Meyer, is because

> The...civilian defense bureaucracy and the cadre of civilian defense intellectuals that surrounds the Pentagon, attempting to influence national military policy...have few counterparts in the rest of the world and none in the Soviet Union. There are no Bernard Brodies, Herman Kahns, or Thomas Schellings."[94]

Thus in contrast to Russia, the United States maintains a high proportion of civilian input to nuclear policy.

The U.S. $C^2$ system falls short of perfection. Even with improvements and technology advances, some problems occur today. A review of documented problems leads one to believe that there were many more problems between

[94] Meyer, "Soviet Nuclear Operations," 473.

1960 and 1980 than from 1980 to the present. Although this is in a large part due to system improvements, it is likely that problems still occur but are not yet public knowledge due to security classification. The rate of occurrence of documented U.S. problems could be higher than that of the former Soviet Union due to more stringent Russian information control. The following paragraphs describe events that resulted in alerts, command system confusion, or higher states of launch readiness.

### 1. Nuclear Operations During the Cuban Missile Crisis of 1962

U.S. forces were ordered to defense condition (DEFCON) 3 at the beginning of the Cuban Missile Crisis. While at DEFCON 3 officials at Vandenberg Air Force Base (AFB) conducted a scheduled Atlas ICBM test launch without first consulting with Pentagon officials. Test officials did not consider that their action could be construed as a hostile launch, and limited their notifications to their local community. Fortunately, Soviet early warning sensors were not sufficiently advanced to have coverage of the launch or flight path areas. Additionally, the launch occurred at the same time that real warheads were replacing payload test bodies on missiles at the same facility. Mistakes in warhead accountability (if such mistakes had taken place) could have resulted in an inadvertent actual warhead launch.[95] The test missile was not, of course, launched at the Soviet Union.

[95] Sagan, *The Limits of Safety*, 79-80.

At the same time, the facility at Malstrom AFB was still under construction. Officials improperly improvised on nuclear weapons procedures that were not designed for the weapons at Malstrom AFB. They did not follow standard Minuteman safety rules. Additionally, maintenance technicians also jerry-rigged some equipment. This created problems in some missiles that risked damage and had to be corrected before the missiles were declared ready for service. Some of these modifications could possibly have compromised system redundancy and negative control.[96]

Although the United States went to a higher state of alert during the Cuban missile crisis, most accounts say the Soviets did not. According to a former Strategic Rocket Forces officer, at one point during the crisis, an order from the high command did cause nuclear bombers to launch on alert patrol and technicians began mating warheads to missiles.[97] The order, however, was rescinded within hours of its release.[98]

Finally at an Air Force Base in Minnesota, a guard saw and shot what he thought was a saboteur (that turned out to be a bear) scaling the perimeter fence of the facility. He sounded the saboteur alarm, which activated alarms in neighboring states. At Volk Field, Wisconsin, improper wiring caused the saboteur alarm to instead actuate the "under attack" alarm, and this sent fighter interceptor pilots rushing for their aircraft. It took quick reaction on the part of the

[96] Sagan, *The Limits of Safety*, 81-90.
[97] Blair, *The Logic of Accidental Nuclear War*, 24.
[98] Sagan, *The Limits of Safety*, 145

base duty officers to communicate and confirm that the "under attack" alarm at Volk was false and to recall the fighters. Had the fighters gone far, the Russian early warning system might have misinterpreted their radar returns as an incoming bomber attack.[99]

### 2. Arab-Israeli War of 1973

When a cease-fire failed between the trapped Egyptian Army and Israeli forces in the Sinai desert, U.S. policy makers received signals that the Soviet Union might be preparing to intervene militarily. To U.S. intelligence, the Soviet airlift fleet appeared to be preparing for a major operation with airborne divisions in a heightened state of alert readiness. Secretary of State Henry Kissinger and Secretary of Defense James Schlesinger sent a signal to warn the Soviets against sending forces to the Middle East by ordering a global U.S. force DEFCON 3 alert. The purpose of the alert was to send a diplomatic warning. Seventy-one B-52s returned from Guam to CONUS and submarines surge deployed. The Soviets (who had apparently taken the hint) reacted by agreeing to send only seventy "observers" instead of a vast military force to Egypt. The U.S. DEFCON 3 alert was terminated soon after the Soviets made this concession.[100]

### 3. U.S. Early Warning System Alerts

In October 1962, the North American Air Defense Command (NORAD) detected two unidentified aircraft crossing the mid-Canada radar line. NORAD

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[99] Sagan, *The Limits of Safety*, 100.
[100] Sagan, *The Limits of Safety*, 212-215.

immediately placed bases on alert, but the radar returns disappeared several minutes later. NORAD never determined whether these were false targets or a result of system failures.[101]

In November 1979, NORAD propelled the nuclear forces to high alert, launching ten aircraft and readying the submarine force for deployment. System displays showed that the United States was under massive attack. After convening a Threat Assessment Conference between NORAD and the NMCC, quick communications with the Ballistic Missile Early Warning System (BMEWS) sites showed this not to be true. The source turned out to be a test scenario tape running in an auxiliary computer that fed erroneous information into the alert system. Technicians failed to anticipate this occurrence. As a result all future tests were run on a system completely divorced from the main computer.[102]

In 1980, NORAD suffered another technical anomaly that resulted in an attack warning. B-52s and airborne command posts (ACP) were made ready. The ACP of the Commander In Chief of U.S. Forces Pacific (USCINCPAC) actually took off.[103] The source turned out to be a failed chip in a minicomputer. The response was again mitigated by a Threat Assessment Conference contacting the BMEWS sites and determining that no attack existed.[104] After this event, NORAD implemented error-checking routines, as well as upgraded hardware, to prevent further occurrences.

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[101] Sagan, *The Limits of Safety*, 99.
[102] Sagan, *The Limits of Safety*, 230.
[103] Bracken, *The Command and Control of Nuclear Forces*, 55.
[104] Sagan, *The Limits of Safety*, 231.

The early warning radar site at Moorestown, New Jersey, contributed to two false warning events. In October 1963, a poorly publicized test launch led radar operators to believe they were under attack. The test launch was of a Titan II from Patrick AFB in Florida toward the South Atlantic Ocean. It took several tense minutes to realize the missile was actually heading away from the United States.[105] The solution to the problem was a change to notification procedures. The second event occurred in October 1962 during the Cuban Missile Crisis. Radar screens showed a missile over Florida with an impact site in the United States. Operators immediately notified NORAD, which did not hold missile contact on any other sensor, particularly the redundant radars at other sites. The Moorestown radar showed impact in Tampa, Florida, but NORAD reported that no other sensors had picked up nuclear detonations. Several minutes passed before the personnel at Moorestown realized that a test tape containing a simulated missile had been inserted into the system.[106]

In November 1961, the Strategic Air Command (SAC) suffered a complete primary communications loss with NORAD and the early warning radar sites. Fearing the worst, SAC placed the nuclear forces on full alert. Several minutes passed before SAC established secondary communications with NORAD and the early warning radar sites through an airborne B-52, which relayed communications between the ground sites. The BMEWS site confirmed that no

[105] Sagan, *The Limits of Safety*, 129.
[106] Sagan, *The Limits of Safety*, 131.

attack had taken place. The cause of the interruption in communications was poorly designed telephone circuits that all passed through a common switching station near Colorado Springs, Colorado. The switching station had suffered a transformer failure.[107]

Incidents involving the U.S. nuclear EW and $C^2$ system show that problems can occur even when designers and users think that the systems are well designed. Problems with communications and sensitivity to the political situation have sometimes caused actions that could have been interpreted as provocative. When system problems did occur, operators displayed sufficient composure and judgement to not allow their worst fears of attack drive precipitous action. As political tensions decrease, operators are more likely to question "bolt out of the blue" alerts. None of the problems, even during crises, resulted in ordering ICBMs or SLBMS to immediate launch readiness. Operators used redundant backup systems to invalidate the original attack indications. The apparent trend within the United States is toward fewer technical system problems that might cause angst in the EW/$C^2$ area. Finally, there is insufficient evidence to support the de-alerting proponents' claim that high alert states translate to a "hair-trigger" condition.

## E. CONCLUSION

This chapter has described some of the important elements of the American and Russian nuclear EW/$C^2$ systems. American and Russian nuclear

[107] Sagan, *The Limits of Safety*, 176.

readiness, or alert state, remains essentially unchanged from Cold War readiness for ICBM and SLBM forces. This chapter concludes that both countries rely on their nuclear weapons systems as instruments that could be used at any time. This is not to say that decision-makers *would* use nuclear weapons right away—only that they desire to maintain the capability for potential immediate use. Their continued reliance on high levels of readiness testifies to confidence in the number and effectiveness of controls that prevent unauthorized, accidental or inadvertent launching of nuclear missiles. Both the United States and Russia also acknowledge and understand the significance of degrading Russian early warning capabilities and are taking positive action to fill EW system coverage gaps.

"Hair-trigger" alert is a term that does not accurately describe the status of the U.S. and Russian nuclear weapons systems. If hair-trigger alert means that the physical system is ready to launch (or would launch) on a moment's notice with little external stimulus (like a cocked pistol with a light trigger), then hair-trigger alert does not exist. There are multiple layers of controls, both technical and political, which have proven to be effective at preventing a precipitous launch of nuclear missiles. The "hair-trigger" characterization for U.S. and Russian nuclear weapons systems is therefore incorrect. *Readiness* to launch does not directly translate to a *willingness* to launch.[108]

[108] The rapid launch readiness, it should be noted, has not applied to bombers since 1991.

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## V. THE FIELD OF DREAMS—IF THE UNITED STATES DE-ALERTED ITS NUCLEAR FORCES, WOULD RUSSIA FOLLOW?

The purpose of this chapter is to examine the possible sequences of steps for establishing a de-alerting regime if decision-makers concluded that such a regime would be beneficial. De-alerting proponents claim that the high alert status of U.S. ICBMs and SLBMs poses a risk of nuclear war, given the condition of Russian EW and $C^2$ systems, and assert that the United States should de-alert its nuclear forces. De-alerting proponents also claim that Russian leaders would reciprocate this U.S. action. As the popular phrase from the movie *Field of Dreams* suggests, "if you build it, they will come." How well could the United States depend on Russia to de-alert its nuclear forces if the United States took the lead? Is this a "field of dreams"?

The de-alerting proponents suggest that de-alerting could be undertaken without a formal agreement such as START II. They believe that this would be the easiest way to reduce the chances of a nuclear war. They also point out that the current system of arms control agreements and treaties suffers from significant delays in political deliberations. For example, START II confirmation remains mired in the Russian Duma.

This chapter first examines the de-alerting proponents' proposition that the United States should unilaterally de-alert its forces and that Russia might follow suit. It then considers other de-alerting possibilities. Russia could unilaterally de-alert, or both countries could de-alert simultaneously or in close succession. This

chapter also examines the chance that one country might exploit potential imbalances in military strength through a pre-emptive or first-strike attack. It examines American and Russian statements relating to the attractiveness and potential problems with de-alerting.

This chapter concludes that the likelihood of either the United States or Russia de-alerting its nuclear forces first while expecting the other country to follow suit is low. Decision-makers might worry that a state whose forces remain on alert might take advantage of the relative difference in nuclear capability and launch a pre-emptive attack. This worry is not empirically supported because neither country has performed the experiment of de-alerting all its ICBMs and SLBMs; it may nonetheless cause decision-makers to block any wholesale ICBM and SLBM de-alerting movement. Thus, if the United States followed the de-alerting proponents' suggestion and took the lead in de-alerting its ICBMs and SLBMs, it is unlikely that Russia would follow.

## A. BILATERAL VS. UNILATERAL DE-ALERTING

De-alerting proponents often suggest unilateral de-alerting. There are some possible advantages for one country to take the lead. It could demonstrate good will and signal that the leadership of the de-alerted country had a high enough level of trust in the other country to be willing to lower its defense posture. There are potential negative consequences as well. The highly-alerted country (or other rogue, third party countries) could take advantage of the de-alerted country by launching a pre-emptive attack in a "window of opportunity." A

crisis could cause an accelerated effort on the part of the lead country to re-alert its forces. Hasty efforts to re-alert nuclear forces might bypass normal safety or security procedures and increase the chances of an accident.

A bilateral de-alerting agreement would seem to be the optimum arrangement for the de-alerting proponents, since it would reduce the operational readiness levels of both sides' strategic nuclear forces at the same time. The action would also help establish a condition closer to a complete abolition of nuclear weapons—the ultimate goal of many de-alerting proponents. However, this arrangement could leave both countries in a weaker position for deterring attacks from third-party states. Additionally, in a crisis involving one or both of the countries, either side might detect activity construed as re-alerting nuclear capabilities. This could lead to a reversal of the de-alerting regime and create an uncontrolled re-alerting race. The instability in this condition would stem from the following question: "At what point in the re-alerting race might one country believe that it had regenerated sufficient capabilities such that a pre-emptive attack might be attractive?"

## B. CRITIQUING THE DE-ALERTING POSSIBILITIES

### 1. The United States De-Alerts Unilaterally

The United States could take the lead in unilaterally de-alerting its nuclear forces. According to de-alerting proponents, the Russians would then feel less threatened by a potential U.S. attack and be less likely to launch their own strategic missiles in response to a false or ambiguous early warning system alert.

Arrangements could be made whereby the United States could take the initiative in de-alerting its ICBMs and SLBMs. Russia would be expected to follow suit with equivalent measures of its own.[109]

This move might be welcomed by some Russians and regarded with suspicion by others, who might suspect a trick of some kind. The move would probably be viewed by a majority of U.S. political and military leaders as damaging to national security. The unilateral U.S. move of de-alerting might be relatively short-lived. The difficulties in this act would not be technical, but political and strategic. From the time the United States de-alerted its strategic missiles until Russia reciprocated, there would be a period in which U.S. leaders might be uncomfortable with being at a disadvantage (that is, more vulnerable) vis-à-vis Russia in nuclear weapons capabilities. This option would be de-stabilizing, because third party states might feel more confident about attacking or coercing the United States without fear of immediate nuclear retaliation. Thus the proposition that the United States should make the first move by de-alerting its ICBMs and SLBMs involves significant risk and would be inherently de-stabilizing.

### 2. Russia De-Alerts Unilaterally

Russia could unilaterally de-alert its ICBMs and SLBMs and make it hard for its decision-makers to authorize nuclear missile launches in response to an early warning system alert. This might be to Russia's advantage, since its nuclear

[109] Blair, "Taking Nuclear Weapons Off Hair-Trigger Alert," 81.

forces are deteriorating more rapidly than U.S. forces. Russian decision-makers, aware of the limitations and shortfalls in their early warning system and the deterioration of their strategic nuclear forces, could make the first move toward de-alerting their nuclear arsenal. Unilateral de-alerting approaches assume that the country that did not initially de-alert its missiles might consider reciprocal action, but these approaches recognize that this would not automatically happen.

Russian decision-makers also could face the same discomfort with a relatively vulnerable nuclear posture as the United States, however, and perhaps more so if one believes that the Russians remain highly suspicious of U.S. intentions. This de-alerting sequence might also create a Russian vulnerability to attack from a third party state that might previously have been deterred by Russia's ability to carry out an immediate response. In this case the Russian ability to respond promptly would be limited. Russia's conventional military capabilities have deteriorated severely since the end of the Cold War, with some estimating that it would take at least ten years to make them "combat-effective."[110] Thus, if the Russians de-alerted first, they could be in a more disadvantaged position for launching a counter-attack. In short, Russia de-alerting first could be just as de-stabilizing as the U.S. case.

[110] Aleksandr Golts, "Russia: Golts on Nuclear Deterrent Forces," *Moscow Itogi* 16 Dec 1997: 28-36, trans. FBIS 23 January 1998.

### 3. A Bilateral De-Alerting Agreement

A third de-alerting approach might involve arrangements for bilateral action. This would probably require detailed negotiations between political and military leaders on both sides to formally agree on the specific de-alerting measures and time frames. De-alerting proponents suggest that an agreement like this would involve negotiations but would not necessarily require any sort of formal ratification process by the Russian Duma and the U.S. Senate. They claim that this agreement could be similar to the 1994 missile de-targeting initiative by Presidents Clinton and Yeltsin.

Verification systems could be put into place while both countries de-alerted their nuclear forces. This would not eliminate the chance of a third party attacking one or both of the de-alerting countries, but it might reduce the number and magnitude of any suspicions the de-alerting countries might hold about each other. The U.S. and Russian strategic nuclear forces could thus remain "balanced." Achieving nearly simultaneous de-alerting of U.S. and Russian ICBMs and SLBMs would require some sort of agreement between Russia and the United States on the timing and extent of the de-alerting. They could de-alert their forces at paces that satisfied both parties. They also could impose intermediate verifications to increase confidence that the balance was being maintained. This type of de-alerting, with inspections and confidence-building measures, would likely take place over a longer period of time than the de-

alerting proponents would prefer. This option, however, would seem to provide the greater promise for maintaining stability while de-alerting than either of the unilateral approaches.

## C. AMERICAN AND RUSSIAN VIEWS

The fundamental question that needs to be addressed is whether the Americans or the Russians, despite the claims of deteriorating Russian early warning and command and control system performance, are willing to de-alert their ICBMs and SLBMs at all. Neither the United States nor Russia embraces the de-alerting concept. This attitude can be seen both in popular and government statements.

### 1. American Views

Mainstream opinion in the U.S. media has been opposed to de-alerting U.S. ICBMs and SLBMs. Critics of de-alerting proposals cite detrimental effects to the credibility and reliability of the U.S. deterrence posture, the loss of flexible response capabilities, and the de-alerting proponents' agenda of abolishing nuclear weapons. A *Wall Street Journal* editorial likened de-alerting to a forced impotence, a "nuclear equivalent of giving a beat cop an unloaded gun and requiring that he radio back to headquarters for bullets when he wants to use it."[111] According to Kathleen Bailey, the combination of deteriorating Russian political conditions, Russia's 1993 abandonment of the Soviet "no first use" pledge, and Moscow's increasing reliance on nuclear weapons in view of its

[111] "Stay on Alert," editorial, *Wall Street Journal*, 20 January 1998: A18.

declining conventional military capabilities, renders a U.S. action of de-alerting first foolish at best.[112]

Moreover, American policy commentaries frequently ask, if it is the Russian system that is deteriorating, is it logical that the United States should degrade the operational readiness of its system in response? The most common answer is no, because the United States is not the problem. The Center for Security Policy expresses opinions similar to those in the *Wall Street Journal* editorial:

> Proponents of de-alerting contend that if the United States stands down its missile forces, it will be able to prevail upon the Kremlin to do likewise, thus preventing an unintended Armageddon. This is a little like saying that because your neighbor's unpredictable Pit Bull poses a danger to the neighborhood, you should shoot the well-trained German Shepherd you need for your protection.[113]

The U.S. Department of Defense continues to advocate a strong strategic nuclear weapons capability. In the *National Military Strategy*, derived from President Clinton's *A National Security Strategy for a New Century*, the Chairman of the Joint Chiefs of Staff confirms the prevailing American belief in deterrence:

> Credible standing nuclear and conventional forces cause potential adversaries to consider the consequences of pursuing aggression. Although most nuclear powers continue to reduce their arsenals, our triad of strategic forces serves as a vital hedge against an uncertain future, a guarantor of our security commitments to our allies, and a deterrent to those who would contemplate developing

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[112] Kathleen Bailey, "'De-Alerting' Nukes Would Imperil U.S. Security," *Wall Street Journal*, 20 January 1998: A18.

[113] "Unilateral Nuclear Disarmament By Any Other Name Is Still Recklessly Irresponsible; Will Clinton Be Allowed To Do It?" *Publications of the Center for Security Policy*, No. 98-D6, 13 January 1998. Available Online: http://www.security-policy.org/papers/1998/98-D6.html

or otherwise acquiring their own nuclear weapons. Strategic nuclear weapons remain the keystone of US deterrent strategy.[114]

Perhaps the most influential person to denounce publicly the de-alerting proposals is former Secretary of Defense Caspar Weinberger. As he points out, many de-alerting proponents have the ultimate goal of eliminating the U.S. nuclear deterrent. He attacks Paul Warnke, a former Director of the Arms Control and Disarmament Agency, for holding what Weinberger considers a shallow view of not just the nuclear, but also the biological and chemical threat to the United States. Weinberger maintains that the United States must be able to deter or counter these other forms of weapons of mass destruction (WMD), and that Warnke is too concerned with furthering nuclear arms reductions to see the necessity of keeping nuclear forces on alert. Additionally, Weinberger maintains that not enough serious consideration is being given to the problems associated with de-alerting verification.[115]

The U.S. government rejected some de-alerting proposals in 1996. In a 4 December 1996 official statement, White House Press Secretary Mike McCurry stated that "we do not believe that removing nuclear weapons from alert status and placing the warheads in controlled storage...is in our security interests."[116] In January 1998 President Clinton tasked the Pentagon with reviewing the de-alerting option. As of December 1999 there has been no apparent public report of

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[114] U.S. Department of Defense, *National Military Strategy*. Available Online: http://www.dtic.mil/jcs/nms/index.html

[115] Caspar W. Weinberger, "The Dangers of Denuclearization," *Forbes*, 23 February 1998: 37.

[116] McCurry quoted in Craig Cerniello, "Retired Generals Re-Ignite Debate Over Abolition of Nuclear Weapons," *Arms Control Today*, November/December 1996: 14.

the Pentagon's findings, although the results may exist in classified sources. There has similarly been no apparent change in the alert status of U.S. strategic nuclear forces.

### 2. Russian Views

The Russians are reluctant to de-alert their forces. While acknowledging that its nuclear systems are aging, the Ministry of Defense continues to assert that it has the situation under control.[117] Russian military leaders remain just as unconvinced as their U.S. counterparts about de-alerting. As the de-alerting proponents acknowledge, even the Russian Strategic Rocket Forces commander is quick to claim that the Russian missile attack warning system is nearly absolutely reliable, and states a false alarm rate as fewer than one in 500 years.[118] The Russian military thus does not subscribe to the theory that there is a high probability of a false warning leading to a launch of Russian nuclear missiles.

Russian leaders, like their American counterparts, also embrace the concept of deterrence and the range of response options that nuclear weapons provide. De-alerting nuclear forces would detract from the deterrent's operational readiness and would reduce the credibility of a prompt (if necessary) response to an aggressive action against Russia. Russia also relies more heavily upon its nuclear forces to offset its conventional force shortcomings in austere times.

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[117] Gordon, "U.S. Urges Russia to Help Avoid False Nuclear Alerts."
[118] Colonel General Vladimir Yakovlev interviewed in Bruce Blair, Harold Feiveson, and Frank von Hippel, "De-Alerting Russian and American Nuclear Missiles," *UNIDR Newsletter* 38 (August 1998): 19.

Contemporary Russian political leaders also express their belief in the utility of nuclear weapons. In 1997, Foreign Minister (and subsequently Prime Minister) Yevgeniy Primakov stated that

> Russia could be the first to use nuclear arms...if we are subjected to aggression. If indeed now, when we are reducing our conventional arms, we find ourselves unable to restrain this aggression, we reserve the right of first use of nuclear weapons. I do not see anything wrong with that.[119]

Evidence of Russia's continuing reliance on its nuclear forces also comes from the country's highest office. President Boris Yeltsin's position on the role of nuclear weapons in national security is clear:

> The Russian Federation consistently pursues a policy of nuclear deterrence. A key role in its implementation is played by maintaining at a sufficient level the Russian Federation's nuclear potential both at a global level (the strategic nuclear forces) and on a regional and local scale (operational-tactical and tactical nuclear weapons) as well as the potential for deterrence by nonnuclear means.[120]

Do Russians feel threatened by other states? There is evidence that the Russian emphasis on deterrence may not flow directly from present security concerns. Rather, as Alexi Arbatov suggests, "Although practically nobody (except for a few extreme hard-liners) seriously envisions a large-scale external threat against Russia in the near future, most politicians, military officials, and

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[119] Yevgeniy Primakov, interview on Russian Television, 24 May 1997. BBC Worldwide Monitoring, *Global NewsBank.* Available Online: http://infoweb9.newsbank.com/

[120] Russian President Boris N. Yeltsin, "Russian Federation President's Message to the Federal Assembly on National Security." *Nezavisimaya Gazeta*, 14 June 1996, trans. FBIS Document ID: FTS19960614000453.

other defense experts want to retain a viable nuclear arsenal to ensure that such a threat does not materialize."[121]

The message from Russia is clear. Russia, like the United States, will continue to maintain its nuclear forces as a credible deterrent against aggression. Part of a credible deterrent is being able to respond to aggression in a timely manner, or at least having one's potential attackers think that response might be swift. De-alerting nuclear forces would work directly against this view of the requirements of an effective deterrent. Additionally, Russia states that it needs ready nuclear forces to offset its conventional weaknesses. Thus Russia is unlikely to de-alert its strategic nuclear arsenal first, if at all.

## D. CREATING "WINDOWS OF OPPORTUNITY"

Much of the previous discussion on de-alerting expressed concerns that if one country decided to de-alert its nuclear forces unilaterally, there would be a period of time in which one state would enjoy a relative military advantage. This imbalance might lead to a pre-emptive attack against the de-alerted country. The hypothesis posited is that the country enjoying the stronger side of the military balance might take advantage of a "window of opportunity" to attack the other country.

How well founded is this hypothesis? Richard Ned Lebow suggests that a relative military advantage need not by itself lead to war. He states that "analysts who believe [that relative military advantage is the decisive consideration in a

[121] Alexi G. Arbotov, "Military Reform in Russia," *International Security*, 22.4 (Spring 1998), 87.

state's decision to go to war] are guilty of conflating means and ends. History indicates that wars rarely start because one side believes it has a military advantage. Rather, they occur when leaders become convinced that force is necessary to achieve important goals." Lebow offers two instances where a military imbalance existed but war did not occur. First, in the 1950s and 1960s the United States had an advantage in nuclear weapons. Despite the recognition that the Soviet Union was rapidly gaining on the United States and would soon have the means to hold the continental United States at risk, U.S. leaders rejected the possibility of a preventive war. Second, the Soviet Union had a relative nuclear advantage vis-à-vis China in the 1960s and 1970s while the latter country was still developing its nuclear capability. Although Soviet leaders considered the merits of conducting a preventive strike on China, they resisted doing so, knowing this would probably leave the USSR vulnerable to Chinese nuclear weapons in the future.[122]

The theory that states do not take advantage of "windows of opportunity" based upon a relative military advantage can be supported by other considerations for nuclear war. A nuclear exchange would be costly to all parties, and political leaders would certainly take this into account when contemplating war. A decision to attack would probably mean unacceptable loss of life, long-term environmental effects, and new rules for international relations. Furthermore, the chance of "winning" a nuclear war could be very poor. It

[122] Lebow, "Windows of Opportunity," 149 and 151.

appears that the costs of exploiting a "window of opportunity" to wage a nuclear war would far outweigh any conceivable gains. Thus decision-makers' fears of an increased risk of attack while in a de-alerted condition are probably misplaced, at least in peacetime, when a relatively low level of political tension and distrust prevails. This does not predict, however, the behavior of states in a crisis; additional political, emotional, and strategic factors might contribute to a decision to launch a pre-emptive attack during a crisis.

Moreover, a non-nuclear attack upon a de-alerted country remains a valid concern. If a country was previously deterred from attacking the United States or Russia because of its nuclear retaliatory capability, then it might decide that the balance was in its favor as soon as Russia or the United States de-alerted its nuclear forces. This country, frequently referred to in the United States as a "rogue state," might use conventional as well as asymmetric (biological or chemical) means to attack. The United States in particular might be vulnerable to this kind of attack, since it has no "in-kind" means of responding to a biological or chemical attack. U.S. decision-makers might therefore have to consider a conventional or low-level nuclear retaliation, if necessary.

## E. CONCLUSION

This chapter has examined beliefs and strategies of Russian and American leaders with respect to the role of nuclear weapons, and the likelihood of Russia and the United States accepting some kind of de-alerting scheme as a way to reduce the chances of an accidental nuclear war. Neither Russian nor

American leaders appear close to believing (1) that a real threat of an accidental nuclear war based on false or ambiguous early warning signals exists, or (2) that de-alerting would fit in with their security strategies, particularly with respect to deterring aggression. The United States could become more vulnerable to an attack if it de-alerted its nuclear forces. Russia would face the same vulnerability; and if attacked by a rogue state, Russia might not have any recourse other than using nuclear weapons, because of its conventional force weaknesses.

Neither Russia nor the United States is in a hurry to scale back the operational readiness of its nuclear arsenals by de-alerting. Thus the de-alerting proponents' optimism is misguided. The "field of dreams" theory for nuclear de-alerting cannot be supported. If the United States de-alerted its forces first (an unlikely prospect), Russia would not likely follow suit.

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## VI. CONCLUSION—DE-ALERTING NUCLEAR ARSENALS AS AN UNLIKELY FORM OF ARMS CONTROL

This thesis has examined a form of arms control dubbed "de-alerting" and has concluded that, while the proposals could be implemented, they would still suffer from verification difficulties and could undermine crisis stability and national security. The de-alerting proponents' chief argument—namely, that a failing Russian early warning system combined with Russian "use or lose" fears creates a high likelihood of nuclear war—cannot be supported. The United States and Russia are taking action to address the problems that have caused de-alerting proponents the most concern, without de-alerting their ICBM and SLBM forces. Chapter I introduced a basic nuclear weapons system (Figure 6) that consists of early warning and military evaluation capabilities (top row), political and military leader assessment and decision (middle row), and means to convey orders to launch platforms to fire their ICBMs and SLBMs (bottom row). De-alerting proponents seek to reduce the perceived likelihood of nuclear war through technical means such as disabling launch platforms or the nuclear missiles themselves. The stated goal of the de-alerting proponents is to extend the time to launch readiness and thus prevent Russian nuclear decision-makers from making a hasty decision to launch, which (the de-alerters contend) they might do in the case of a false or ambiguous warning.

## A. VERIFICATION WOULD BE PROBLEMATIC, AND CRISIS STABILITY AND NATIONAL SECURITY MIGHT BE DEGRADED

Chapter II described actions taken in the wake of the Cold War to reduce the chances of an accidental nuclear war and examined the feasibility of de-alerting proposals. The analysis concluded that the methods are physically feasible, but implementing them could have undesirable effects upon launch platform survivability and crisis stability. Verification uncertainties, moreover, could present additional problems for national security.

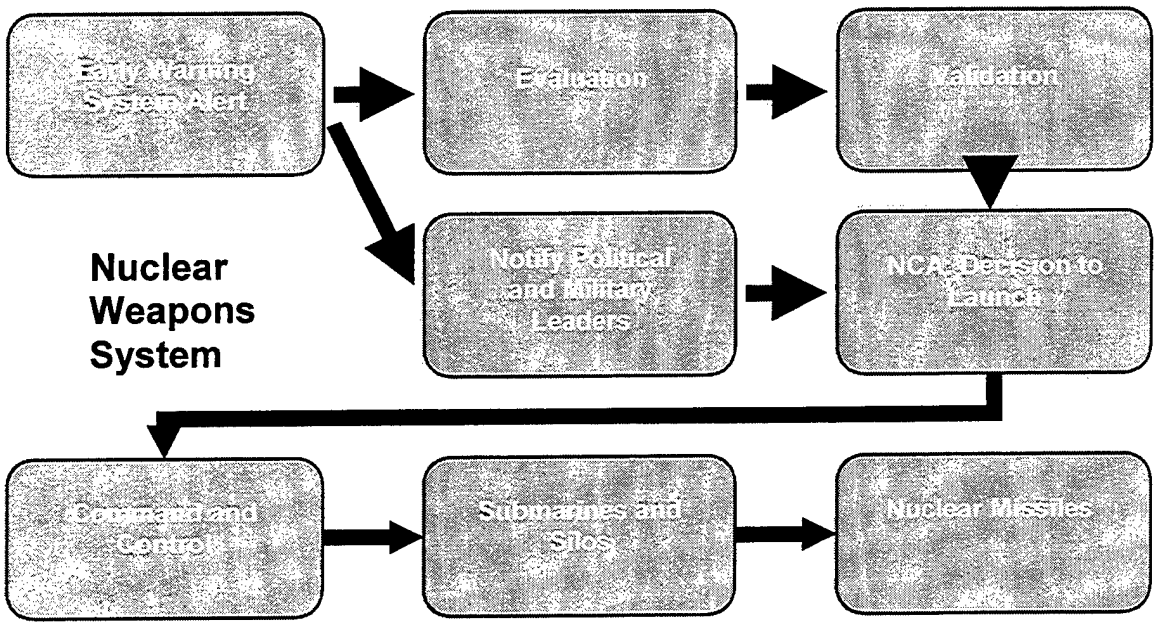


**Figure 6: Basic Nuclear Weapons System**

The proposed de-alerting measures affect only ICBM and SLBM launch platforms and the nuclear missiles, the bottom row of Figure 6. The proposals all involve technical measures that would be relatively easy to implement but much more difficult to verify. The larger difficulty lies in the problems these de-alerting

measures would introduce, such as decreased launch system survivability in the case of submarines, or the possibility of an uncontrolled move to re-alert in a crisis. Russian and American leaders would likely consider any move toward de-alerting as "blunting the sword" of their military strength and readiness; and they would therefore probably be unwilling to consider a de-alerting scheme. Chapter II suggests that instead of technical solutions, finding ways to change Russian decision-makers' beliefs about U.S. intentions, the middle row of Figure 6, would be a better way of reducing the chances of an accidental nuclear exchange.

## B. INSUFFICIENT BASIS FOR THE DE-ALERTING ARGUMENT

Chapters III and IV examined the two key elements of the de-alerting proponents' argument in support of de-alerting. The de-alerting proponents argue (1) that the Russians fear a U.S. attack that would destroy Russian nuclear forces, and (2) that Russian early warning system performance is degrading so badly that there will be a higher probability of false alarms and hence greater chances of a Russian "launch on warning." The de-alerting proponents frequently use the term "hair-trigger" alert, which these chapters have shown to be an inaccurate and misleading characterization of the Russian and American nuclear weapons systems. Chapters III and IV discussed the de-alerting proponents' claim that the current combination of Russian mistrust and EW system unreliability creates a Case IV (of Figure 7) condition of high chances of an accidental nuclear war. This thesis has shown that Russian fear of a U.S. nuclear attack is in fact low and that both countries are acting to reduce the rate of

Russian EW system false alarms. Thus Russia and the United States will probably tend to remain in a Case I condition, with a low chance of an accidental nuclear war.

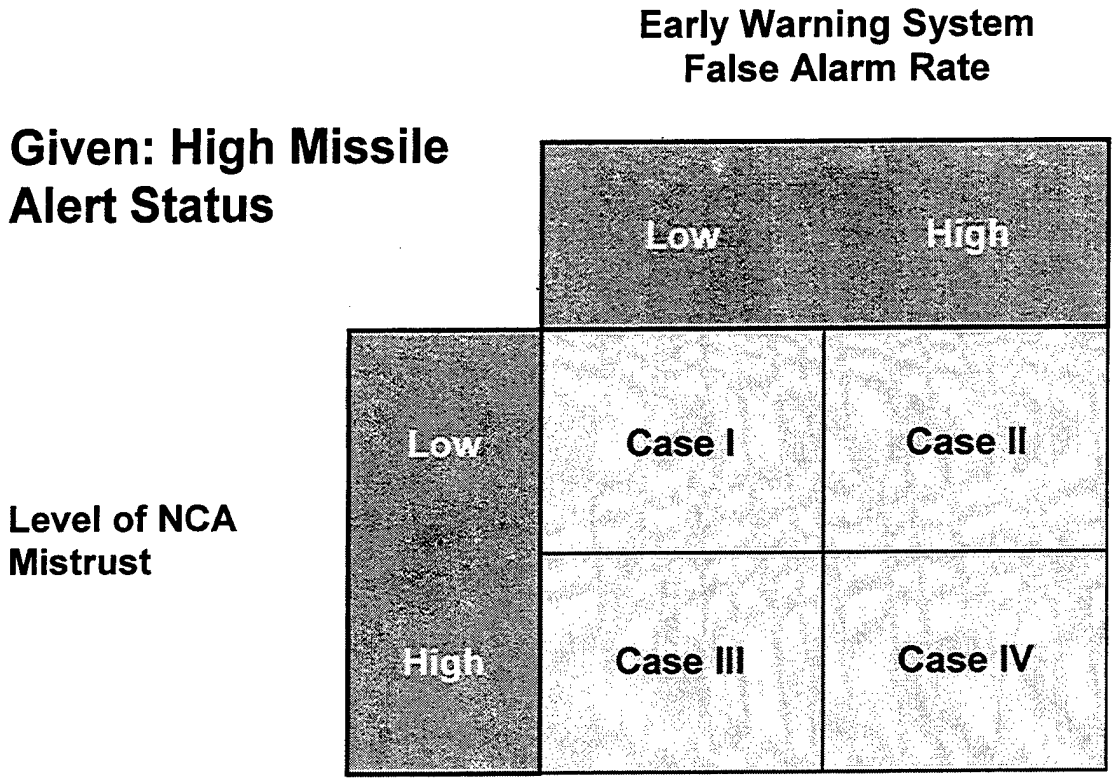


**Figure 7: Relative Chances of a Nuclear Missile Launch from a False Alarm**

Chapter III concluded that Russian strategic culture has created some fears of a U.S. attack, but these fears probably exist more in military early warning centers than in decision-making bodies. When presented with a false or ambiguous missile attack warning, Russian decision-makers would probably not launch their nuclear missiles against the United States. Russian decision-makers would respond based upon a preponderance of information tempered by their

beliefs about U.S. intentions and methods. Russian mistrust of American intentions exists, but perhaps little more so than between other competing nations. There is certainly not a high enough level of mistrust to cause an automatic launch of the country's ICBMs and SLBMs by Russian decision-makers owing to a false or ambiguous warning in technical sensor systems.

The most significant conclusion in Chapter III was that the claimed Russian "use or lose the ability to retaliate" belief probably does not have a strong basis in actual Russian thought today. Invulnerable underground command facilities and continuing improvements in the mobile nuclear arsenal, with new-generation mobile ICBMs and submarines, indicate that Russian leaders rely increasingly on survivable forces, which are able to "ride out" an attack and maintain a retaliatory capability. These forces give the Russian authorities a strong incentive to be cautious and prudent in the face of a missile attack warning.

## C. U.S. AND RUSSIAN NUCLEAR SYSTEMS DO NOT EXHIBIT "HAIR-TRIGGER" EFFECTS

Chapter IV described some of the important elements of the American and Russian nuclear EW/$C^2$ systems. It concluded that both countries rely on their nuclear weapons systems as instruments for use at any time. This is not to say that decision-makers *would* use nuclear weapons right away; however, they wish to maintain the capability for immediate use. Their continued reliance on a high level of readiness testifies to their confidence in the number and effectiveness of the controls that prevent unauthorized, accidental or inadvertent launching of

nuclear missiles. Both the United States and Russia also acknowledge and appreciate the significance of deteriorating Russian early warning capabilities and are taking positive action to fill EW system coverage gaps, most notably through joint early warning arrangements.

"Hair-trigger" alert is an emotive term that does not accurately describe the status of the U.S. and Russian nuclear weapons systems. If hair-trigger alert means that the physical system is ready to launch (or launches) on a moment's notice with little external stimulus (like a cocked pistol with a light trigger), then hair-trigger alert does not exist. There are multiple layers of technical and political controls that have proven to be effective at preventing a precipitous launch of nuclear missiles. The "hair-trigger" characterization for U.S. and Russian nuclear weapons systems is incorrect. *Readiness* to launch does not directly translate to a *willingness* to launch. Thus the de-alerting proponents' basic argument for proposing de-alerting cannot be supported. There is no reason to de-alert Russian and American nuclear forces on the factual basis of this argument.

## D. THE UNITED STATES AND RUSSIA ARE UNLIKELY TO DE-ALERT THEIR NUCLEAR FORCES

Chapter V examined the possibilities for establishing a de-alerting arrangement, if one or both countries' leaders decided that de-alerting might indeed be beneficial. De-alerting proponents propose that the United States unilaterally de-alert its nuclear forces and argue that Russia would follow with reciprocal measures of its own. The chapter considered this possibility and two

others: Russia could unilaterally de-alert its forces first or both countries could agree to some kind of simultaneous bilateral de-alerting action.

There are some concerns that Russia or the United States (or a third party) might take advantage of a "window of opportunity" to attack the de-alerted state. The chapter concluded that this is unlikely in normal peacetime conditions, given several instances in the past in which the military imbalance alone did not result in a pre-emptive attack. Other political, social, strategic, or economic factors would have to be present to raise the chances of a pre-emptive attack; and the risk of such an attack could be more significant in crisis conditions.

Chapter V next examined the current beliefs and strategies of Russian and American leaders with respect to the role of nuclear weapons, and the likelihood of their accepting some kind of de-alerting scheme as a way of reducing the chances of an accidental nuclear war. It then explored the question: If the United States de-alerted first, would Russia follow suit? The chapter concluded that neither Russian nor American leaders appear close to believing (1) that a real threat of an accidental nuclear war based on false or ambiguous warning signals exists, or (2) that de-alerting would fit in with their security strategies, particularly with respect to deterring aggression. The United States could become more vulnerable to an attack if it de-alerted its nuclear forces. Russia would face the same vulnerability; and if attacked by a rogue state, Russia might not have any recourse other than using nuclear weapons, because of its conventional force weaknesses.

Neither Russia nor the United States is in a hurry to scale back the operational readiness of its nuclear arsenals by de-alerting. Thus the de-alerting proponents' optimism is misguided. The "field of dreams" theory for nuclear de-alerting cannot be supported. If the United States de-alerted its forces first (an unlikely prospect), Russia would not likely follow suit.

The case for de-alerting, as this thesis has shown, is based on overstated estimates about the likelihood of nuclear war stemming from a mistaken analysis of Russian beliefs about U.S. intentions and the implications of a deteriorating early warning system in Russia. By evoking fears of "nuclear Armageddon" and using emotive terms such as "hair-trigger" alert, the de-alerting proponents propose immediate reductions in Russian and American nuclear capabilities. They suggest that de-alerting could easily be done outside of the established international system of treaties and agreements. Some opponents of de-alerting point out that de-alerting could be the first step toward what many of the "de-alerters" really want—a complete abolition of nuclear weapons. Reductions in force levels may occur for the reasons pointed out in this thesis—such as through natural system attrition due to aging, an economic inability to continue supporting programs, or arms control agreements such as START I—but reductions will not take place on the basis of the de-alerting argument alone. The United States and Russia are cooperating to reduce mistrust and improve system reliabilities. This action is being taken outside of a de-alerting regime.

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